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ABSTRACT

This is the first workbook-text in a two-part series written for deaf students. It is remedial in nature, aimed at the secondary level, and covers addition, subtraction, multiplication, and division of whole numbers. The use of the number 10 in explaining the concepts presented is stressed throughout. For the second workbook, see SE 015 828, and for the teacher's guide, see SE 015 829. (DT)

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UNDERSTANDING MATH - 1

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UNDERSTANDING MATH - PART I

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TO THE INSTRUCTOR

It is the intent of the authors that this book be used as a guide and text for teaching the student to better understand the basic mathematical concepts so very important in our ever-changing society.

When a concept is presented to a student, it is reinforced by providing the student with several practice problems. Quizzes are also provided to enable the student to examine his understanding of the various concepts.

A key point of the book is the use of the number 10 in explaining the concepts presented. If a student can count up to the number ten, he should be able to progress through all the various concepts with a thorough understanding.

The number 10 can be found in many areas of our everyday lives. Our methods of counting and telling time, and our currency are all based on the number 10.

The book describes the role that the number 10 plays in the number system, and also its relationship to other numbers. Thus, the number 26 would contain two sets of 10 and six sets of 1. The number 100 would contain ten sets of 10.

Further discussion in the book includes procedures for carrying and borrowing these groups of 10's and also describes the role that the number 10 plays in the processes of multiplication and division. The areas of fractions and formulas are included and presented after the student has acquired an understanding of the basic processes.

HOLLIS W. WYKS

ROBERT J. AUSTIN

TABLE OF CONTENTS

Part I

CHAPTER I – ADDITION PAGE

Single-Digit Numbers 1
Problems 3
Number 10 in Addition 4
Zero in Addition 7
Problems 9
Addition Chart 10
Double-Digit Numbers 11
Problems 12
Carrying 14
Problems 19
Math Games 26
Proving Addition 27
Problems 29
Quiz 32
Word Problems 33

CHAPTER II – SUBTRACTION

Introduction 39
Problems 41
Borrowing 42
Zero in Subtraction 45
Proving Subtraction 46
Problems 47
Borrowing – Hundreds and Thousands 48
Problems 50
Borrowing from Zero 52
Problems 53

PAGE

Vocabulary Words 56
Word Problems 57
Quiz 59

CHAPTER III – MULTIPLICATION

Introduction 61
Multiplication Tables 63
Problems 64
Multiplying by 9 67
Carrying 68
Problems 69
Zero in Multiplication 71
Problems 73
Multiplying Two and More Numbers 74
Problems 77
Proving Multiplication 81
Problems 84
Number 10 in Multiplication 87
Problems 89
Word Problems 92
Math Games 95
Division as a Kind of Multiplication 96
Problems 97
Extra Credit Problems

CHAPTER IV – DIVISION

Introduction 98
Problems 101
Dividing into Two Numbers 105
Problems 106
Remainders 107
Problems 109

PAGE

Dividing Larger Numbers 111
Problems 112
Carrying in Division 114
Problems 116
Proving Division 118
Problems 120
Zero in Division 121
Problems 123
Coming Close to the Dividend Number 125
Problems 126
Word Problems 127
Dividing by Two and More Numbers 129
Problems 131
Number 10 in Division 136
Problems 137
Dividing Without Pencil and Paper – Problems 138
Word Problems 139
Quiz 143
Math Games 144
Extra Credit Problems

CHAPTER I – ADDITION

Every day we use numbers. Sometimes we think about them, like when we come to class for **Arithmetic.** Other times we use them but we don't think about them. For example:

How old are you? (I am _____ years old.)
What time is it? (It is _____ past/before _____ o'clock.)

How tall are you? (I am _____ feet and _____ inches tall.)
How much do you weigh? (I weigh _____ pounds.)

In each of these examples you used numbers. You used some kind of **measurement,** and you did some **mathematics.** You used numbers, but you did not think hard about them.

Did you notice the word "hard" in the last sentence? Many boys and girls tell me that mathematics is "hard." It is hard if you do not understand numbers. It is hard if you cannot use them correctly. Something is easy for you when you know how to do the problem, so that your answers are always correct.

I am sure you know of the old saying "It is as easy as 1, 2, 3," or "It is as easy as 2 X 2." Well, I wouldn't say that mathematics is that easy, but if you can count to 10, you can learn mathematics. You can learn to add, subtract, multiply, divide, and even do algebra and geometry! If you can count to 10, you can get correct answers. You can also prove your work easily, so that you **know** it is correct.

But first we should learn about numbers.

Our dictionary would tell us that a number is

"a word or a figure that tells **exactly how many.**"

Examples:

There are exactly ___ apples.

There is exactly ___ car.

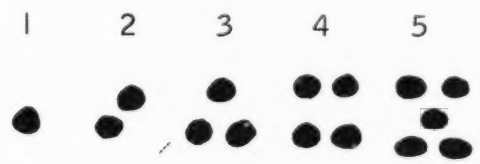
There are exactly ___ cookies.

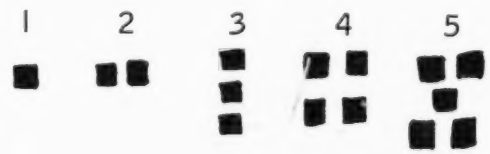
I do not think anyone found those problems very hard to do. But I wonder if you understood that you were **adding**? That was what you did as you answered those questions.

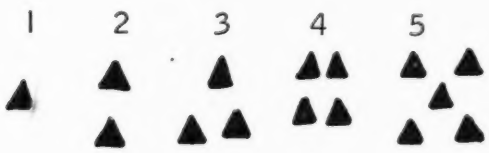
Now for another example. How many ballons are there?

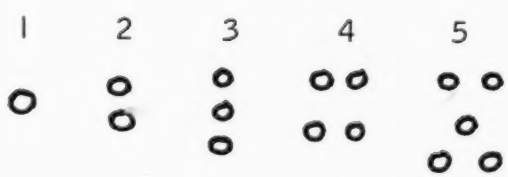
As you counted, did you say to yourself "balloon," or did you say "one," "two," "three," "four"? I think you said "one," "two," "three," "four."

Let's try more examples:









Examples:

1. and is _____

2. and is _____

3. and is _____

4. and is _____

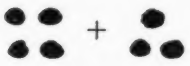
5. + is _____

6. + is _____

7. + = _____

8. + = _____

9. = _____

10.  = _____

11. = _____

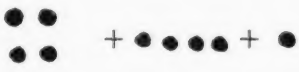
12. = _____

13. = _____

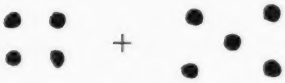
14. = _____

15. = _____

16. = _____

17.  = _____

18. = _____

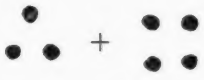
19.  = _____

20. = _____

21. = _____

22. = _____

23. = _____

24.  = _____

I think everyone was able to do the example problems with very little trouble. "Very good," you say, "but what about the number 10? How is it going to help us learn mathematics?"

All right, let's look at 10. Ten, or 10, is the most important number we have. All our counting, our time, and our money are built upon that number. Ten is an "even" number (a number that can be divided easily by 2).

Look at these examples and fill in the blank spaces:

A) 1, 2, 3, ____, 5, 6, ____, 8, ____, ____

B) 10¢, 20¢, ____, 40¢, ____, ____, ____, ____, 90¢, ____

C) 100, ____, 120, ____, ____, 150, ____, ____, 180, ____, ____

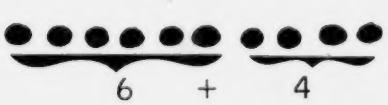
D) 12:00, 12:10, 12:20, 12:____, 12:____, 12:____, 1:00

E) 10, 11, ____, 13, ____, ____, ____, 17, 18, ____, ____

The number 10 comes after all the **single** numbers (Example A) and is the first of the **teen** numbers (Example E). Any single number is less than 10. Let's draw a picture of ten and compare it to some single numbers.

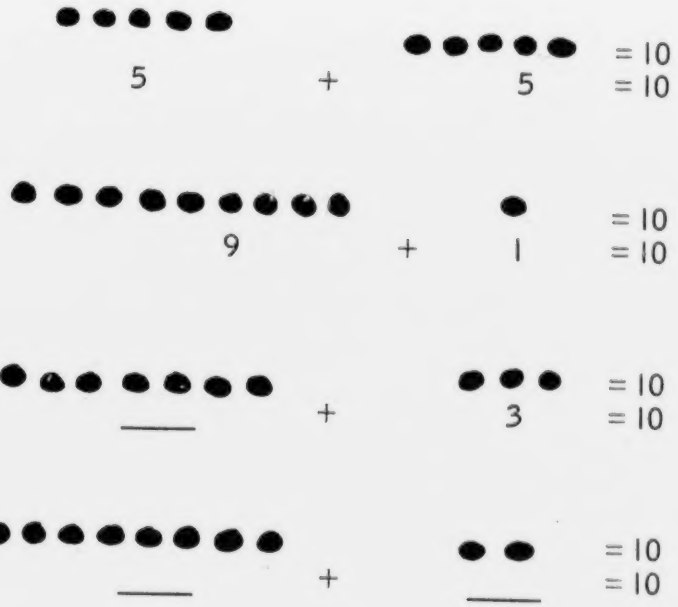
1) Compare **six** =6

2) Compare **four** =4

However, if we put
#1 and #2 together – 

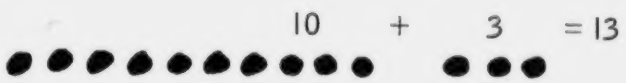
= 10
= 10

Try some others:



Now we will do the same with the "teen" numbers.

Compare **thirteen**



Compare **sixteen**

You have just seen something very important that will help to make mathematics easier. When you look at a "teen" number, the "1" in the number means **one group of 10** and the other number tells you **how many 1's.**

For example: **14**

The number (1)[4] is **one group of ten** and **four ones.**

(10 + 4 = 14)

The number (1)[7] is **one group of ten** and **seven ones.**

(10 + 7 = 17)

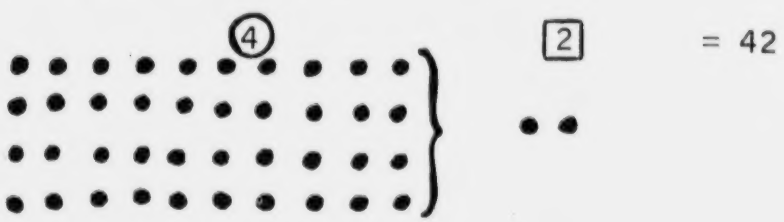
Thinking ahead a little, any number up to 100 can be separated the same way.

Example: **2 3**

(2)[3]

The (2) means **two groups of ten.** The [3] means **3 ones.**

Suppose you had $42.00. You would have –



($40 + $2 = $42)

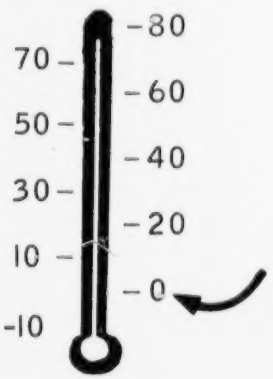
Now let us look at the number 10 itself. The 10 shows us that there is **one group of 10** and **no ones.** The figure "0" is called **zero.**

ZERO

A zero can be

I A starting point: 0 – 1 – 2 – 3 – 4 – 5 ––––––

II A separation point:



III A figure that means **none:**

	1	2	3	4	5	6	7	8	9	
Visitors	0	0	2							
Home Team	1	1	0							

Using the **scoreboard** in example III, we see that in the first inning our team made one run; the visiting team did not score. In the second inning the same thing happened, but in the third inning the visitors scored two runs and our team did not score any runs. To find the score at the end of the third inning, we just add the number of runs scored by each team.

	Visitors	Home Team
	0 (no runs)	1
	0 (no runs)	1
	+ 2	+ 0 (no runs)
Total	2	2

Now we can see that the zero must be used to fill the place of a number, but that it does not change the number to which it is added. This is true no matter where the zero is placed in the **column** to be added.

Examples:

2	0	5	6	0	6	3	0
+ 0	+ 4	0	1	7	0	0	0
		+ 3	+ 0	+ 2	+ 2	+ 0	+ 0

*REMEMBER, you **must use** the zero. This becomes very important later on in your mathematical work.

Now we shall see how well we can add single numbers. Do the addition problems on the next page and then find your own score by using the **chart** at the top of the page.

Let's try for a good score
on the next page!

My Correct Answers _____

Best score is 56 correct answers.
Fair score is 50 to 55 correct.
(If you score below 45 correct answers, you need more practice.)

	A	B	C	D	E	F	G	H
1.	3 + 2	4 + 1	7 + 1	8 + 0	5 + 4	6 + 0	8 + 1	0 + 3
2.	2 + 6	9 + 0	4 + 3	5 + 3	6 + 3	2 + 5	1 + 0	2 + 2
3.	5 + 0	1 + 1	0 + 7	2 + 4	3 + 3	2 + 7	2 + 1	1 + 3
4.	0 + 2	3 + 4	4 + 2	8 + 2	9 + 1	6 + 1	2 + 6	7 + 3
5.	1 8 + 1	4 2 + 3	3 2 + 0	2 1 + 4	7 1 + 2	3 1 + 4	3 2 + 3	4 0 + 5
6.	3 1 + 5	2 2 + 2	7 0 + 2	5 3 + 2	1 6 + 2	5 1 + 4	3 3 + 4	4 1 + 4
7.	2 1 +7	3 2 + 7	5 0 + 3	4 2 + 5	6 1 + 3	4 2 + 3	7 3 + 2	6 1 + 1

Fill in this addition chart by adding the number from Column A to the numbers in the top row. (A few samples have been completed to show you how.)

A	0	1	2	3	4	5	6	7	8	9	10
0	0										
1											
2											
3					7						
4											
5											
6											
7						12					
8											
9											
10								17			

The problems you have just finished were all single-number addition. Now we are going to do addition with **double** numbers.

Example:

$$\begin{array}{r} 23 \\ +\ 42 \\ \hline \end{array}$$

You remember that 23 is two groups of 10 plus three ones, and that 42 is four groups of 10 and two ones. To help you remember this, let's do the problem this way:

	tens	ones
	2	3
+	4	2
	6	5

Now you can see that your answer contains **6** groups of 10 plus **5** ones.

Try these practice problems.

tens	ones
1	6
+ 5	2

ens	ones
3	7
+ 2	2

tens	ones
1	4
1	2
+ 3	2

tens	ones
4	2
2	3
+ 2	3

Do you understand the idea? Good, let's do some more!

Let's hop to the next page
and do some problems!

My Correct Answers_____

Best score is 36 correct answers.
Fair score is 32-34correct answers.
(If your score is below 30correct, you need more practice!)

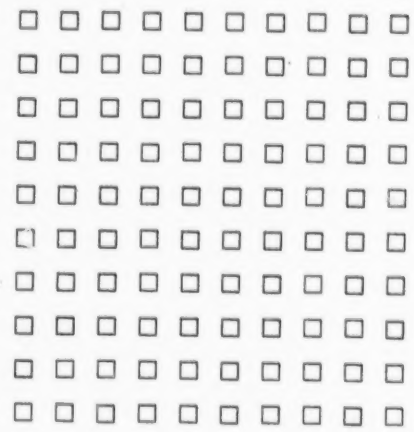
	A	B	C	D	E	F
1.	tens ones 6 5 + 1 2	tens ones 8 1 + 1 5	tens ones 4 7 + 2 2	tens ones 4 3 + 3 6	tens ones 8 1 + 1 7	tens ones 8 3 7 2
2.	tens ones 1 4 + 3 0	tens ones 4 3 + 2 6	tens ones 6 2 + 1 5	tens ones 5 4 + 3 5	tens ones 2 6 + 3 0	tens ones 6 5 3 2
3.	tens ones 2 6 + 3 0	tens ones 5 3 + 3 4	tens ones 5 4 + 1 4	tens ones 4 1 + 5 0	tens ones 2 4 + 6 3	tens ones 4 6 2 1
4.	tens ones 6 3 + 5 4	tens ones 7 1 + 4 5	tens ones 5 1 + 7 2	tens ones 8 0 + 4 0	tens ones 4 4 + 2 5	tens ones 9 5 7 0
5.	tens ones 5 4 + 9 3	tens ones 9 5 + 6 3	tens ones 6 0 + 8 4	tens ones 8 3 + 5 4	tens ones 5 0 + 5 0	tens ones 4 5 9 1
6.	tens ones 6 1 4 7	tens ones 5 8 7 1	tens ones 9 3 2 4	tens ones 6 2 7 3	tens ones 7 4 8 5	tens ones 3 6 7 1

Let us look at one problem again. This time the answer is shown.

tens	ones
5	0
+ 5	0
10	0

By now we know that an answer like this means:
10 groups of ten and **no** ones.

But we have a short way of saying **10 groups of 10.** What is it? Look at this block of squares. There are 10 groups of 10 squares. How many squares are there altogether? **One hundred.** So "100" is a short way of saying "10 groups of 10."



Now we can talk about larger numbers. Up to now we had **groups of 10** and **number of 1's.** Now we will also have **groups of 100.** We will have:

Hundreds — Tens — Ones

We could now change our problem to look like this:

hundreds	tens	ones
	5	0
+	5	0
1	0	0

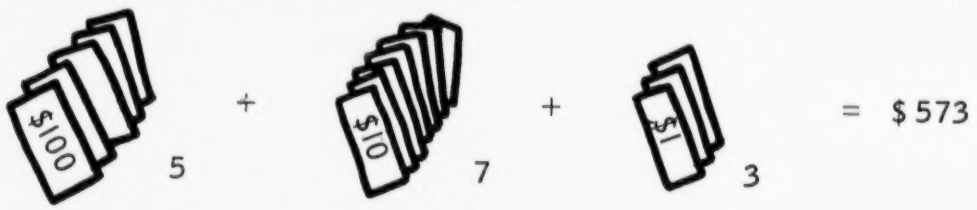
which means **one hundred**
plus **no tens** and **no ones.**

Let's see how this helps us to understand a large number better.

Example:

573 = 5 7 3 Here we have 5 groups of 100, plus 7 groups of 10, plus 3 ones.

If this example was about dollars, we would have



Grouping numbers helps us to understand "carrying" numbers in addition problems. "Carrying" is not **difficult** (hard) for you when you understand that numbers are really groups of ones, tens, and hundreds.

To understand how and why we "carry" a number in addition, add this problem of single numbers.

$$\begin{array}{r} 4 \\ 2 \\ +\ 6 \\ \hline \end{array}$$

If you did this correctly, your finished problem looks like this:

$$\begin{array}{r} 4 \\ 2 \\ +\ 6 \\ \hline 12 \end{array}$$

By now we know that this answer **drawn as a picture** would be:

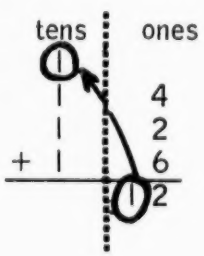
(10 + 2 = 12)

= 12

In a problem where we must "carry," it would be the **group of ten** that is carried.

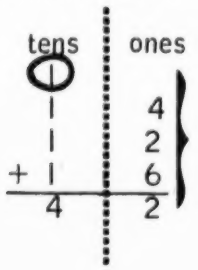
Example: Now let us add 14 + 12 + 16.

tens	ones
1	4
1	2
+ 1	6

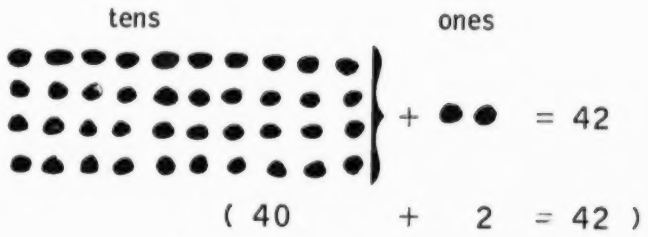


We start out with 1 + 1 + 1 or **3 groups of ten** in this problem. But when we add the 4 + 2 + 6 **groups of one**, we get the number 12. This number has **one group of ten** in it, plus a 2. So we "carry" the one group of ten. That means we **add it** to the three groups of ten that we started with. We now have **four groups of ten**, plus a 2.

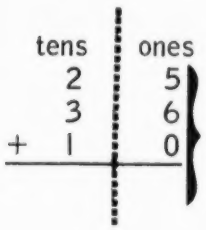
Our finished problem would look like this:

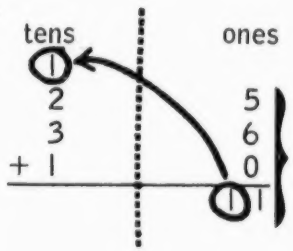


or

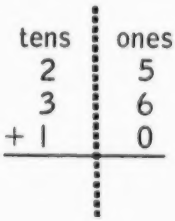


Here is another example:

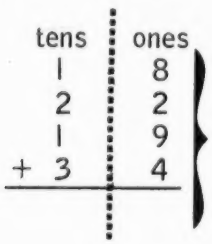


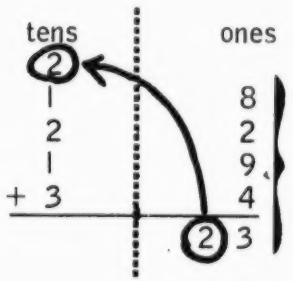


Now finish the problem



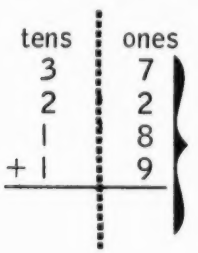
Another example:

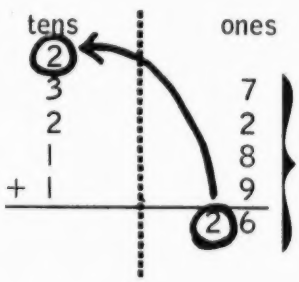




In this example, we had <u>two</u> groups of ten to carry, so we carry the (2).

And yet another example:





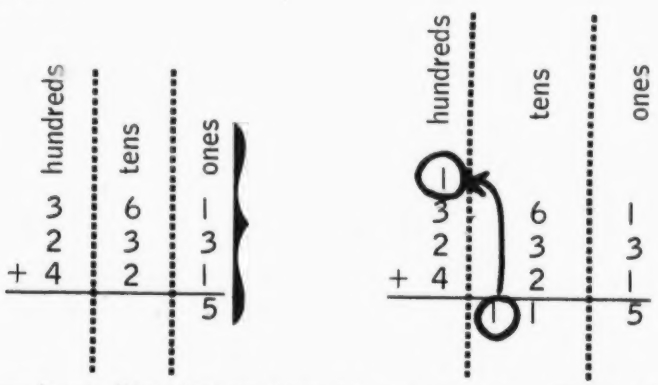
Again we must carry <u>two</u> groups of ten.

Here are some practice problems:

	A	B	C	D
1.	tens ones 3 9 1 1 + 1 2	tens ones 4 0 2 6 + 1 4	tens ones 2 3 1 6 + 1 9	tens ones 1 9 2 9 + 3 9
2.	tens ones 3 1 6 2 + 9	tens ones 4 2 2 6 + 2 8	tens ones 5 3 3 0 + 1 7	tens ones 1 2 2 1 3 3 + 1 4
3.	tens ones 1 6 2 0 + 4 5	tens ones 2 7 1 8 + 9		

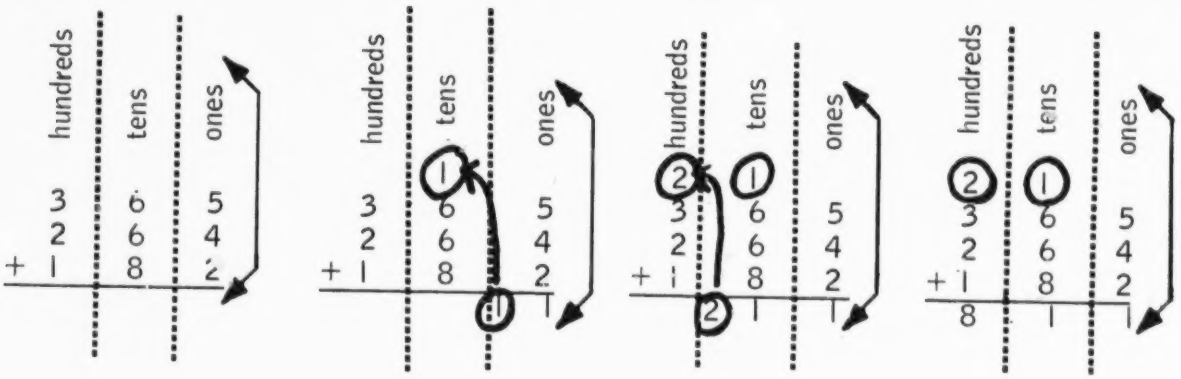
Now let us add some larger numbers. This time we will have to carry **groups of hundreds** instead of groups of ten.

Example:



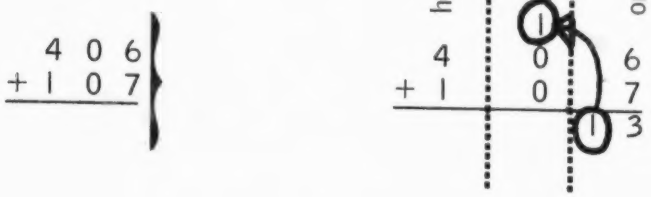
In this example we find that we have 11 groups of **ten.** Since 10 groups of ten is **one** hundred, we carry the **1** to the top of the "hundreds" column and add it in with the rest of the numbers in the column.

Another example:



Let me give you one more example, using **zeros**, and then you can practice some more. Remember, you **must use** the zero, but it does not change the number it is added to. This is important especially when you carry.

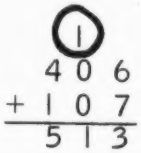
Example:



When you come to the "tens" column, you add the 1 which you carried to the 0's. Now the column will look like this:

You know that 1 + 0 + 0 = 1.
Put down the 1 as the answer for this column.

So, your finished problem will have an answer like this:



Here are some practice problems:

	A	B	C	D
	hundreds tens ones	hundreds tens ones	hundreds tens ones	hundreds tens ones
1.	3 6 5 + 4 5 8	2 7 9 + 3 4 5	3 4 7 + 2 6 8	1 9 6 + 2 7 8
2.	2 2 8 + 3 9 3	3 4 6 + 3 8 9	6 2 8 + 2 9 3	3 6 9 + 2 7 6
3.	2 7 6 + 5 9 5	2 6 8 + 3 7 5	3 7 6 + 2 8 7	1 6 7 + 2 8 6
4.	3 3 7 + 3 9 6	2 8 3 + 3 7 9	3 7 2 + 2 7 9	2 9 7 + 1 7 6

Now is a good time to be sure you understand everything we have been doing. Go back to page #1 and read it. Then **glance** at all the pages we have completed. If you have any questions, do not be afraid to ask them. This is the way to learn!

Let's shoot for a good score
on the next page!.

My Correct Answers _____

Best score is 96 correct answers.
Fair score is 80-90 correct answers.
(If you score below 80 correct, you need more practice)

	A	B	C	D	E	F
	tens ones	tens ones	tens ones	tens ones	tens ones	tens ones
1.	6 5 + 3 4	1 7 + 4 5	3 1 + 8 8	5 7 + 1 2	8 0 + 4 0	5 4 + 3 9
2.	2 3 + 6 3	5 9 + 3 6	6 0 + 2 8	4 2 + 4 5	2 3 + 2 5	5 3 + 1 7
3.	4 6 + 2 6	2 7 + 9	3 8 + 4 5	5 0 + 2 3	1 5 + 2 1	1 3 + 7 9
4.	2 5 + 6 7	4 4 + 1 8	3 6 + 2 1	1 8 + 3 6	4 3 + 1 6	3 4 + 6
5.	3 8 + 1	4 7 + 1 2	2 7 + 6 0	6 4 + 1 1	6 2 + 1 7	2 2 + 5 6
6.	1 0 + 4 9	3 8 + 6 0	1 2 + 3 1	5 0 + 1 7	1 4 + 6 5	7 9 + 1 0
7.	3 8 + 1 0	2 5 + 7 0	2 0 + 7 0	6 7 + 1 1	6 8 + 1 1	4 0 + 4 0

	A	B	C	D	E	F
8.	72 +27	97 + 7	38 +18	29 +57	24 +68	71 +19
9.	57 +36	18 +72	20 +90	22 +48	51 +53	76 +34
10.	63 +82	84 +59	54 +29	74 +49	69 +43	32 +39
11.	87 +24	69 +21	42 +65	89 +27	45 +71	25 +79
12.	85 +26	68 +36	83 +28	23 +88	35 +61	38 +57
13.	50 +73	43 +77	66 +30	67 +41	75 +58	81 +33
14.	37 +55	56 +31	64 +52	31 +46	47 +80	44 +70
15.	40 +60	78 +56	62 +78	20 +83	37 +22	88 +51
16.	82 +76	78 +84	37 +54	59 +23	74 +38	87 +64

My Correct Answers _____

Best score is 42 correct answers.
Fair score is 35-40 correct answers.
(If you score below 35 correct, you need more practice)

	A	B	C	D	E	F
	hundreds tens ones	hundreds tens ones	hundreds tens ones	hundreds tens ones	hundreds tens ones	hundreds tens ones
1.	2 7 2 + 4 5	1 2 5 + 9 3	3 6 7 + 5 1	5 1 8 + 9 1	1 5 2 + 5 7	6 7 2 + 3 5
2.	4 8 2 + 9 1	6 8 2 + 6 5	3 7 5 + 7 2	2 7 6 + 9 2	4 5 2 + 8 5	3 8 8 + 4 1
3.	6 5 3 + 7 2	4 5 4 + 7 5	2 7 1 + 8 7	2 2 5 + 9 3	2 8 3 + 9 2	4 5 6 + 5 3
4.	3 9 1 + 3 7	2 7 3 + 8 6	5 3 7 + 8 2	3 7 4 + 6 2	6 8 3 + 9 6	6 7 6 + 6 3
5.	4 9 2 + 5 8	7 8 4 + 6 6	8 4 7 + 9 8	8 1 4 + 8 6	4 4 4 + 6 6	5 4 8 + 7 7
6.	3 8 9 + 9 7	4 1 7 + 5 6	1 2 5 + 7 5	1 0 6 + 9 4	9 0 9 + 9 1	7 3 9 + 9 2
7.	8 7 4 + 8 7	6 3 9 + 9 2	4 8 7 + 4 9	5 7 9 + 3 8	3 8 6 + 7 6	2 4 9 + 8 9

My Correct Answers_____

Best score is 35 correct answers.
Fair score is 28-33 correct answers.
(If you score below 28 correct, you need more practice!)

	A	B	C	D	E
1.	637 + 224	348 + 636	428 + 548	216 + 469	217 + 375
2.	194 + 232	395 + 473	543 + 385	364 + 354	255 + 351
3.	566 + 240	500 + 275	300 + 632	406 + 107	630 + 175
4.	473 + 379	418 + 492	262 + 238	289 + 124	386 + 198
5.	362 + 127	871 + 147	294 + 126	775 + 158	387 + 249
6.	471 + 228	782 + 28	451 + 239	681 + 245	147 + 253
7.	368 + 623	449 + 841	832 + 273	747 + 158	558 + 764

My Correct Answers _____

Best score is 36 correct answers.
Fair score is 30-34 correct answers.

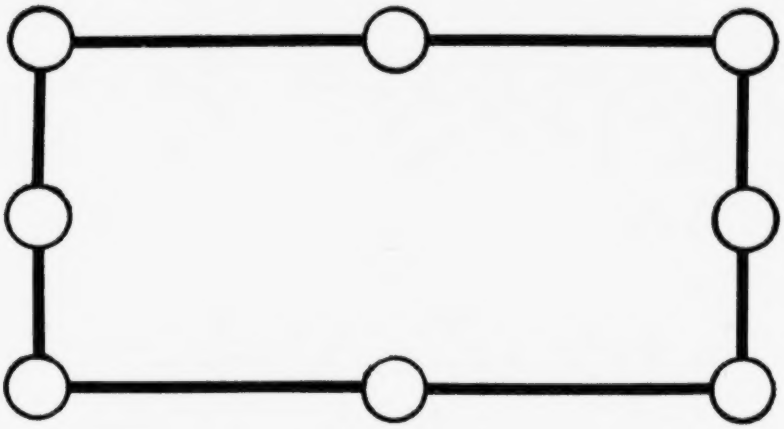
	A	B	C	D	E	F
1.	12 13 +25	42 15 +28	27 13 +15	42 26 +27	49 21 +28	63 15 +18
2.	45 17 +36	42 15 +27	29 43 +15	28 15 +46	33 49 +15	28 32 +15
3.	43 15 +28	15 16 +38	21 14 +36	41 29 +28	10 36 +44	28 15 +43
4.	45 87 +56	47 89 +57	37 98 +74	68 15 +64	38 67 +96	59 29 +60
5.	48 75 +34	77 87 64 +95	74 53 61 +25	86 38 94 +75	71 98 67 +49	85 73 68 +40
6.	64 34 61 +29	59 33 61 +75	37 42 51 +88	28 37 61 +91	46 84 73 +13	52 13 77 +49

My Correct Answers _____

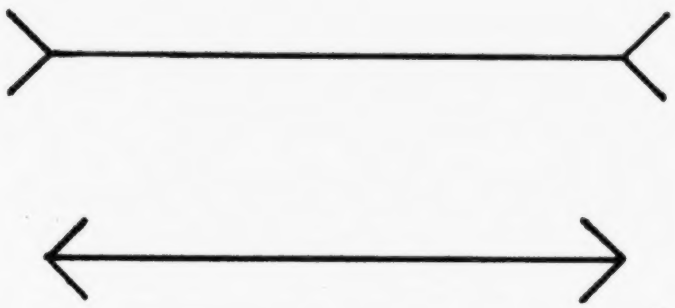
Best score is 78 correct answers.
Fair score is 65-75 correct answers.

	A	B	C	D	E	F
1.	46 21 +32	53 13 +25	27 31 +48	20 75 +32	26 71 +42	15 27 +14
2.	45 32 +14	27 26 +41	37 20 +41	25 43 +23	71 21 +15	43 28 +81
3.	73 41 +15	26 63 +45	31 20 +15	26 47 +23	26 43 +51	53 24 +34
4.	62 43 +54	38 21 +45	56 21 +44	63 38 +39	46 21 +25	53 47 +72
5.	43 71 +26	81 25 +44	75 20 +45	91 27 +31	85 70 +80	99 41 +50
6.	55 60 +44	91 80 +76	17 81 +21	33 29 +68	40 66 +90	72 36 +48

	A	B	C	D	E	F
7.	12 18 +24	96 60 +24	56 43 +28	95 36 +14	17 21 +42	49 20 +41
8.	72 40 +80	68 43 +14	26 15 +14	37 21 +43	14 72 +31	92 27 +41
9.	80 42 +30	50 27 +30	39 41 +32	64 71 +27	72 31 +48	29 82 +37
10.	89 22 +30	56 42 +68	47 29 +31	82 44 +79	65 86 +27	34 22 +44
11.	26 38 +12	37 17 +44	81 53 +88	58 92 +41	79 33 +99	86 27 +19
12.	53 22 +57	76 91 +83	84 41 +55	87 40 +39	24 20 +66	21 67 +80
13.	33 61 +80	36 88 +42	88 57 +38	74 21 +47	69 71 +30	51 40 +82



Place the numbers 1, 2, 3, 4, 5, 6, 7, 8, in the circles so that the three numbers on each side add up to the same amount.



Which of these two lines is longer?

Before we go any further, I think it would be a good time to learn how to "prove" our work. To "prove" your work is a good **habit.** It helps to improve your **accuracy,** and one thing that a boss likes is a worker who is **accurate.** The "magic number" in proving is 10. To show you how it works, here is a sample problem.

Example:

$$\begin{array}{r} 362 \\ +217 \\ \hline 579 \end{array}$$

To "prove" the answer 579, we first **add across** each row of numbers:

$$3 + 6 + 2 = 11$$
$$2 + 1 + 7 = 10$$

This is where 10 comes in again. If the new number is 10 or larger than 10, you just add the two parts of the number together like this:

$$\begin{array}{rl} 3 + 6 + 2 = 11 & (1 + 1 = 2) \\ 2 + 1 + 7 = 10 & (1 + 0 = 1) \\ \hline 5 \quad 7 \quad 9 & \textcircled{3} \end{array}$$

Now add the parts of the answer together: 5 + 7 + 9 = 21

$$\begin{array}{rl} 362 \rightarrow & 1 + 1 = 2 \\ +217 \rightarrow & 1 + 0 = 1 \\ \hline & \textcircled{3} \\ 579 \rightarrow & 2 + 1 = \textcircled{3} \end{array}$$

Since both of your answers come to the same number (in this case (3)) the answer (579) is correct.

Here is another example:

$$\begin{array}{r} 447 \\ +802 \\ \hline 1249 \end{array}$$

$$4 + 4 + 7 = 15 \rightarrow 1 + 5 = 6$$
$$8 + 0 + 2 = 10 \rightarrow 1 + 0 = +1$$
$$\textcircled{7}$$
$$1 + 2 + 4 + 9 = 16 \rightarrow 1 + 6 = \textcircled{7}$$

This may seem like quite a bit of work now, but as you use this **method**, you will become faster and more accurate. Also, isn't it a nice feeling to know that your work is correct **before** you show it to someone else?

Take a look at one more sample problem before you try some on your own.

Example:

$$\begin{array}{r} 789 \\ 575 \\ +687 \\ \hline 2051 \end{array}$$

$7 + 8 + 9 = 24 \rightarrow 2 + 4 = 6$

$5 + 7 + 5 = 17 \rightarrow 1 + 7 = 8$

$6 + 8 + 7 = 21 \rightarrow 2 + 1 = 3$

$17 \rightarrow 1 + 7 = (8)$

$2 + 0 + 5 + 1 = (8)$

I hope you were able to follow the examples.

Here are some problems already completed for you. All you have to do is "prove" them.

1) $\begin{array}{r} 362 \\ +217 \\ \hline 579 \end{array}$

2) $\begin{array}{r} 525 \\ +670 \\ \hline 1195 \end{array}$

3) $\begin{array}{r} 814 \\ +365 \\ \hline 1189 \end{array}$

4) $\begin{array}{r} 807 \\ +960 \\ \hline 1767 \end{array}$

How did you do? Did you find any mistakes?_____
Which problem? #_____
What should the answer have been?_____

As you do the next problems,
prove your work on another piece of paper.

There is no waiting around
for the problems on the next page.

My Correct Answers _____

Best score is 30 correct answers.
Fair score is 20-25 correct answers.
(To get the best score, prove your work !)

	A	B	C	D	E
1.	27 +93	39 +83	57 +96	39 +66	27 +89
2.	43 70 +30	58 60 +40	82 59 +64	56 47 +34	89 34 +47
3.	901 373 +970	610 820 +560	700 499 +385	341 880 +235	799 730 +727
4.	39 72 84 +95	67 58 43 +18	28 37 73 +82	56 74 46 +64	78 67 56 +95
5.	$790 $980 +$460	$485 $755 +$901	$245 $600 +$356	$826 $209 +$138	$642 $451 +$849
6.	$1.30 $4.56 + .39	$2.45 $ .60 +$9.65	$45.60 +$70.10	$ .16 .45 .89 + .26	$2.52 $1.75 $1.75 $9.00

My Correct Answers _____

Best score is 25 correct answers.
Fair score is 18-22 correct answers.
(To get the best score, prove your work!)

	A	B	C	D	E
1.	236 481 397 + 428	316 124 738 + 121	421 384 264 + 513	321 456 879 + 314	237 329 456 + 324
2.	326 548 923 + 428	367 142 398 + 423	561 254 326 + 591	287 324 532 + 426	382 596 348 + 423
3.	$4.26 5.31 4.27 + 7.24	$682 425 362 + 781	$3.25 4.35 9.50 + 4.25	$6.15 3.27 8.30 + 5.60	$264 352 436 + 458
4.	$684 326 438 + 271	$3.15 4.25 9.35 + 2.60	$6.75 4.95 8.85 + 7.35	$5.15 1.73 3.87 + 5.40	$962 430 541 + 873
5.	537 228 571 + 632	428 219 322 + 455	$6.32 5.11 3.38 + 8.97	819 317 864 + 232	$7.89 4.27 3.48 + 8.69

My Correct Answers _____

Best score is 20 correct answers.
Fair score is 16-18 correct answers.
(To get the best score, prove your work!)

	A	B	C	D	E
1.	473 355 863 + 537	$9.35 4.75 2.45 + 6.25	$693 284 262 + 722	$5.12 3.68 4.56 + 9.21	$693 585 245 + 781
2.	878 643 685 + 787	987 483 982 + 486	189 986 483 + 782	986 687 582 + 568	683 298 634 + 596
3.	$3.07 .46 9.27 8.04 + .90	$7.30 .87 9.05 5.00 + .39	$4.37 8.20 .79 3.10 + .15	$9.75 .35 8.10 .95 + 4.75	$9.05 8.30 .75 3.10 + .65
4.	$9.10 5.45 .90 3.05 + .80	$3.10 8.25 .75 .10 + .10	$8.99 8.60 .68 5.80 + 9.25	$2.85 6.45 9.80 4.30 + 4.65	$974.05 875.00 401.00 350.50 + 210.95

Think you're feeling bright ?
Try the quiz on the following page.

QUIZ

	A	B	C	D	E	F	G	H
1.	3 7 + 9	5 9 + 7	8 6 + 3	5 6 + 0	9 7 + 5	9 6 + 3	5 2 + 8	8 4 + 7
2.	12 + 18	32 + 47	67 + 23	34 + 26	78 + 23	27 + 38	69 + 24	
3.	32 64 65 + 72	12 34 52 + 26	24 13 30 + 37	45 52 53 + 23	36 26 78 + 75	46 27 87 + 36	72 86 93 + 21	

Do these problems and prove your answers.

4. 365
+ 458

5. 279
+ 345

6. 347
+ 268

7. 196
+ 278

8. 375
279
+ 372

9. 293
376
+ 287

10. $1.67
2.86
+ 4.38

11. $337.10
396.55
+ 169.25

I think that all of us understand that problems on our jobs do not come all printed on paper like those we have just finished. Usually you have to find the numbers, put them down, and then know what to do with the numbers. Sometimes the numbers are told to you; sometimes you see them on a **blueprint** or **pattern**; and sometimes you cannot see them, "hear" them, or even feel them, but must have them in your head. This last group is the hardest to do, but once you learn to find the numbers and use them, even the hardest problems become fun to do.

The best way to start learning to do these problems is to draw a picture of the problem. I know this may sound childish to some of you, but it is an important step. With a picture of the problem in front of you, you can see whether to add, multiply, subtract, or divide. For instance, when you want to find the total (or the sum) of a group of numbers, you would add. If all the numbers to be added were the same, it would be easier to multiply. But since we have just finished addition, let's work with addition problems now and save the rest until later.

Here is an example:

Mary bought a hat for $3.78, a dress for $25.00, and a pocketbook for $4.95. How much did she spend altogether?

The word "altogether" tells us that we need a **total.** To find a total we **add.** So----

As you can see, you do not have to be a great artist to draw the problem, but even so, you get a better understanding of the problem.

Another example:

Robert and Jane went on a date and played Minature Golf. On the first hole, Bob took 4 strokes to put the ball through, and Jane took 7. On the second hole, Jane took only 3 strokes, but Bob needed 6 to put the ball in the hole. On the third hole they both were tied with 4 strokes. Jane used 4 on the fourth hole, and Bobby needed 5 strokes. Who took the most strokes so far? For our "picture" we will make a **chart.**

	Robert	Jane
1st hole	4	7
2nd hole	6	3
3rd hole	4	4
4th hole	5	4
Total		

Now if you add their strokes, you will find the answer to the problem.

Why did we add the strokes and not the holes? (You have to be careful not to add numbers that are not important to **solving** the problem.)

Here is another sample problem to show what we mean:

A carpenter asked the lumber company for 1,200 board-feet of 2" x 4" fir in 16' lengths; 700 board-feet of 2" x 6" fir in 14' lengths; 720 board-feet of 2" x 10" in 12' lengths. How many board-feet did he **order** altogether? (Ask yourself these questions:)

1 Are the lengths of the lumber important? _____
Are the lengths important in finding the answer? _____

2. Are the measurements (2" x 4"; 2" x 6"; 2" x 10") important?_____
Are the measurements important in finding the answer?_____

3. Are the board-feet (1,200; 700; 720) important?_____
Are the board-feet important in finding the answer?_____

Now go ahead and finish the problem. Be sure to prove your work!

These problems will be of interest to boys.

1. The Auto Shop's payroll for last week was:
   Jones, $85.00; Hanks, $105.25; Smith, $138.00, Brown, $141.20.
   Find the total payroll for last week. $_____

2. The Upholstery Shop ordered 12 yards of velvet, 23 yards of muslin, 37 yards of velour, and 49 yards of burlap. How many yards of cloth did the Upholstery Shop order?_____ yards

3. Last year the Auto Shop used 42 gallons of paint thinner, the Cabinet Shop used 28 gallons, the Metal Shop used 8 gallons, and the Industrial Arts Shop used 10 gallons. Find the total number of gallons used by these shops._____ gallons.

4. Find the cost of a new Mustang with a basic cost of $2,372.00 plus $162.00 for 225 h.p. V-8, white walls $33.90, 4-speed manual transmission $188.00, tinted windshield $21.55, and power steering $86.30. $_____

These problems will be of interest to girls.

1. The payroll in the Power Machine Shop for last week was:
   Page, $75.00; Sears, $67.80; Roberts, $69.20; Green, $65.50.
   Find the total payroll for last week. $_____

2. Employees in three dressmaking factories numbered 397 women, 208 women, and 178 women. How many women were employed in the three factories? _____women.

3. The foods classes last year used 78 gallons of milk, 60 gallons of skim milk, and 42 gallons of cream. Find the total number of gallons used by the classes. _____gallons.

4. The Drapery Making Class made new curtains and drapes for the girls' dormitory. They used 12 yards of velvet, 36 yards of Indian Head, 42 yards of muslin, and 23 yards of decorator's burlap. How many yards of cloth did they use? _____ yards.

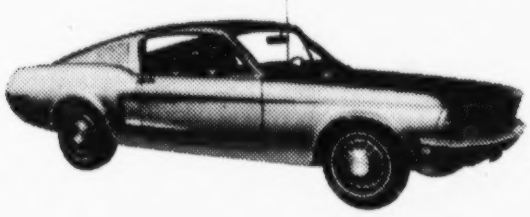
These problems will be of interest to boys.

1. A defensive half-back played for the Giants for 3 years. He gained 328 yards in 1969 and 265 yards in 1970 on punt returns, intercepted passes, and some playing as an offensive half-back. In 1971 he played full-time as an offensive half-back and gained 643 yards. In three years, how many yards did he gain for the Giants? _____ yards.

2. Complete this chart about minimum stopping distances.

Minimum stopping distances at different speeds			
M.P.H.	Reaction Time Distance	Braking Distance	Total stopping Distance
10	11 Feet	9 Feet	20 Feet
20	22	23	
30	33	45	
40	44	81	
50	55	133	
60	66	206	
70	77	304	

It is interesting to note that the Reaction Time is only 3/4 of a second! Look how far a car travels **before** you even put your foot on the brake – in 3/4 of a second!



These problems will be of interest to girls.

Cindy gave a wedding shower for her sister.

1. She invited 8 girls from school, 2 cousins, 3 aunts, the groom's two sisters and his mother, and her mother. How many people did she invite?_____

2. Cindy served coffee, ice cream, and cake, and had two dishes of candy. The coffee cost her 89¢, the ice cream $1.75, $2.10 for the cake, and she paid 98¢ for the candy. How much did the refreshments cost Cindy? $_____

3. During the evening they played games, and she gave some funny prizes to the winners. The first prize cost 50¢, the second cost 25¢, and the third prize 19¢. How much did she pay for the prizes? $_____

4. Cindy also gave her sister a blanket, for which she paid $7.95. Including the food, prizes, and gift, how much did the shower cost Cindy? $_____

5. Virginia works in a cottage after school. She is paid $1.45 an hour. On Monday she worked 1 hour, on Tuesday she worked 2 hours, and on Wednesday and Thursday she worked a total of 5 hours. How many hours did she work?_____ hours.

6. On Saturday night, Virginia did some baby-sitting for neighbors for 60¢ an hour. She stayed for 4 hours. Virginia charges 75¢ an hour for every hour she baby-sits after midnight. If she worked an hour after midnight, how much did she earn before midnight? $_____. How much did she earn for her four hours' work? $_____

7. How much did Virginia earn this week from her two jobs? $_____

8. Patti went shopping with her mother. She had $25.00 to spend on clothes for school. She bought a blazer jacket for $18.95, white tennis shoes for $3.98. She also bought knee socks for $1.49 and a belt made of rope for 59¢. Did she spend more or less than the $25.00? _____

These problems will be of interest to boys.

1. A new Thunderbird convertible has a basic cost of $4,953.00. How much would a car like this cost if you added these extras: tinted windows and windshield $43.00, power windows $106.20, real leather upholstery $106.20, safety-convenience control panel $58.00. Total cost $_____

2. The standard engine for the Thunderbird has $48\frac{3}{4}$ (48.75) cubic inch displacement for each cylinder. Each cylinder develops 37½ (37.50) horsepower. There are 8 cylinders in the Thunderbird engine.

   A) How many cubic inches is this engine?_____.
   B) How many horsepower is this engine?_____.

3. Al Downing of the New York Yankees pitched to five men in one inning. Each man got to a full count of 3 balls and 2 strikes. Downing struck out three of the men and walked two.

   A) How many strikes did he throw?_____
   B) How many balls did he throw?_____
   C) How many pitches did he throw altogether? _____

Now that we've had a lot of practice adding numbers, we are ready to go on to something new. Up to now we have **added** one number to other numbers. Now we will **take away** one number from another. You know, of course, what this is called: **subtraction.**

CHAPTER II – SUBTRACTION

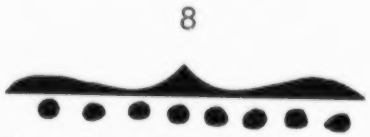
We can see by the above cartoon that someone doesn't know how to subtract correctly, because 3 boys subtracting 4 hamburgers doesn't leave any for poor old Dad!

Drawing a problem may still seem childish, but it does help to understand what is happening when you subtract.

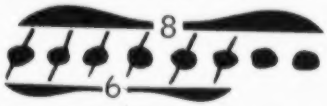
Example:

$$\begin{array}{r} 8 \\ -6 \\ \hline \end{array}$$

Draw circles to match the top number like this:



Now take your pencil and cross out as many circles as the bottom number, like this:



The number of plain circles that are left should be the correct answer. Since there are two circles left, the answer should be

$$\begin{array}{r} 8 \\ -6 \\ \hline 2 \end{array}$$

How about 9 **minus** 2? "Minus" means to subtract, or take away. We will picture the problem this way:

$$\begin{array}{r} 9 \\ -2 \\ \hline \end{array}$$

$$= \begin{array}{r} 9 \\ -2 \\ \hline 7 \end{array}$$

Try some problems like the examples you just saw.

1. $\begin{array}{r} 7 \\ -5 \\ \hline \end{array}$

2. $\begin{array}{r} 8 \\ -3 \\ \hline \end{array}$

3. $\begin{array}{r} 9 \\ -6 \\ \hline \end{array}$

4. $\begin{array}{r} 7 \\ -3 \\ \hline \end{array}$

5. $\begin{array}{r} 10 \\ -8 \\ \hline \end{array}$

6. $\begin{array}{r} 15 \\ -7 \\ \hline \end{array}$

7. $\begin{array}{r} 18 \\ -9 \\ \hline \end{array}$

8. $\begin{array}{r} 16 \\ -7 \\ \hline \end{array}$

9. $\begin{array}{r} 13 \\ -6 \\ \hline \end{array}$

10. $\begin{array}{r} 11 \\ -3 \\ \hline \end{array}$

11. $\begin{array}{r} 12 \\ -4 \\ \hline \end{array}$

12. $\begin{array}{r} 11 \\ -5 \\ \hline \end{array}$

13. $\begin{array}{r} 14 \\ -8 \\ \hline \end{array}$

14. $\begin{array}{r} 11 \\ -7 \\ \hline \end{array}$

15. $\begin{array}{r} 12 \\ -3 \\ \hline \end{array}$

16. $\begin{array}{r} 14 \\ -9 \\ \hline \end{array}$

17. $\begin{array}{r} 14 \\ -7 \\ \hline \end{array}$

18. $\begin{array}{r} 12 \\ -6 \\ \hline \end{array}$

19. $\begin{array}{r} 15 \\ -9 \\ \hline \end{array}$

20. $\begin{array}{r} 12 \\ -8 \\ \hline \end{array}$

21. $\begin{array}{r} 13 \\ -8 \\ \hline \end{array}$

22. $\begin{array}{r} 13 \\ -7 \\ \hline \end{array}$

23. $\begin{array}{r} 15 \\ -7 \\ \hline \end{array}$

24. $\begin{array}{r} 15 \\ -8 \\ \hline \end{array}$

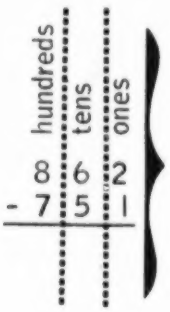
My Correct Answers _____

Best score is 70 correct answers.
Fair score is 60-65 correct answers.

	A	B	C	D	E	F	G	H
1.	1 - 1	2 - 1	2 - 2	3 - 2	3 - 1	3 - 3	4 - 1	4 - 4
2.	4 - 3	4 - 2	5 - 2	5 - 5	5 - 3	5 - 4	5 - 1	6 - 1
3.	6 - 4	6 - 2	6 - 3	6 - 5	6 - 6	7 - 6	7 - 5	7 - 3
4.	7 - 2	7 - 1	7 - 4	7 - 7	8 - 1	8 - 2	8 - 7	8 - 6
5.	8 - 5	8 - 8	8 - 4	8 - 3	9 - 8	9 - 9	9 - 2	9 - 5
6.	9 - 6	9 - 4	9 - 1	9 - 3	9 - 7	10 - 1	10 - 8	10 - 7
7.	10 - 2	10 - 3	10 - 5	10 - 6	10 - 9	10 - 4	10 - 10	11 - 2
8.	12 - 7	15 - 8	16 - 8	18 - 9	13 - 6	14 - 5	17 - 9	12 - 9
9.	15 - 6	16 - 7	16 - 9	18 - 7	18 - 8	17 - 8		

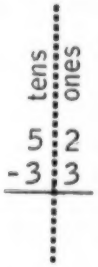
As we did in addition, when we learned to **carry**, we shall separate our numbers into "hundreds," "tens," and "ones." In this way we can learn to **borrow** correctly. If we do not borrow correctly, we cannot subtract correctly.

Example:



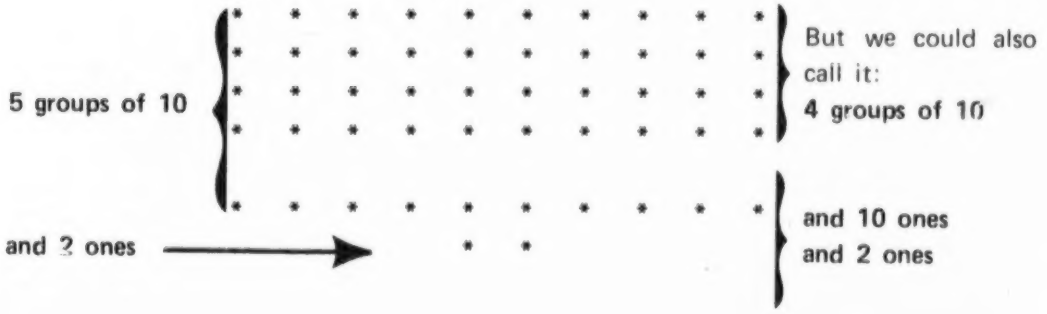
Complete the example problem.

Here there was no reason to borrow in order to subtract. All the numbers in the top row were larger than the numbers in the bottom row. But it will not always be this way. Here is another example:



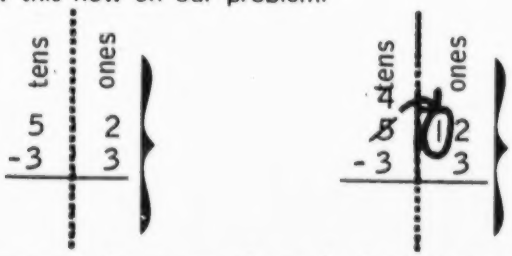
Let us start to subtract. We start, of course, with the "ones" column. We must take 3 away from 2. But how can we do that? The number 3 is larger than the number 2. We need to have a number on top that is larger than 3.

The **whole** number on top is 52. We know that 52 means **5 groups of 10 and 2 ones**. We can make a picture of it, like this:



We have **borrowed** one of the groups of ten and called it 10 ones. Together with the 2 ones, there are now 12 ones. But we have not changed the number itself – it is still 52.

We can show this now on our problem.

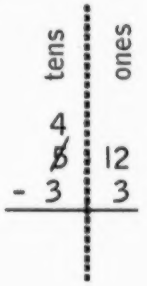


When we borrowed the group of ten, it changed the number from 5 groups of ten to 4 groups of ten. To remind us of this, we cross out the 5 and write 4 above it. This shows us we now have only 4 groups of ten in that column.

At the same time, we place the number 1 in the "ones" column to show that we have added 1 group of ten to that column. (10 ones)

$$\begin{array}{r} 10 \\ +\ 2 \\ \hline 12 \end{array}$$ Understand?

Now you can complete the problem that looks like this:



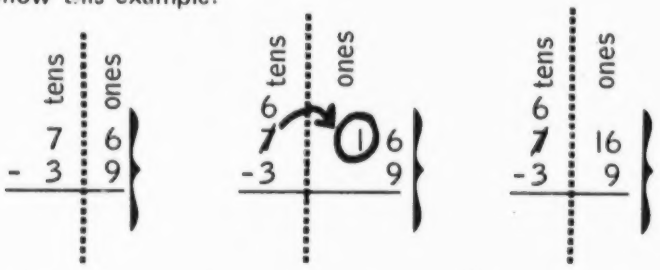
Now instead of doing one large problem

$$\begin{array}{r} 52 \\ -33 \\ \hline \end{array}$$

you are doing two easy ones,

$$\begin{array}{r} 4 \\ -3 \\ \hline \end{array}$$ and $$\begin{array}{r} 12 \\ -\ 3 \\ \hline \end{array}$$

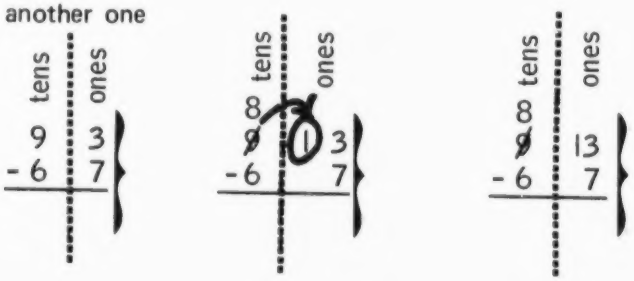
Follow this example:



Complete the example.

Do you understand, or would you like to see another example?

O.K. Here's another one



Finish the problem.

Now it's your turn to do some borrowing. Complete these practice problems.

	A	B	C	D
1.	tens ones 9 4 - 5 5	tens ones 7 6 - 4 9	tens ones 8 2 - 7 5	tens ones 9 4 - 8 5
2.	tens ones 8 6 - 7 3	tens ones 8 5 - 6 6	tens ones 7 1 - 4 5	tens ones 8 3 - 6 7
3.	tens ones 4 2 - 9	tens ones 7 2 - 2 5	tens ones 9 8 - 8 2	tens ones 2 1 - 8
4.	tens ones 2 5 - 6	tens ones 9 3 - 7 4	tens ones 6 2 - 4 7	tens ones 3 2 - 1 4
5.	tens ones 8 7 - 8	tens ones 3 4 - 6	tens ones 6 3 - 5	tens ones 5 2 - 7

Before we go on, we had better talk about our old friend Zero. Again, as in addition, the zero does not change the number it is subtracted from. **But you cannot** subtract a number from a zero.

$$\begin{array}{r} 8 \\ -\,0 \\ \hline 8 \end{array} \qquad \begin{array}{r} 0 \\ -\,8 \\ \hline \end{array}$$

When a zero appears in the top row, and you must subtract from it, you **borrow and change the zero to 10** so that you can subtract.

Example:

$$\begin{array}{r} 4\ 0 \\ -\,1\ 6 \\ \hline \end{array} \qquad \begin{array}{r} 3\ \ 10 \\ \not{4}\ \ 0 \\ -\,1\ \ 6 \\ \hline \end{array} \qquad \begin{array}{r} 3\ \ 10 \\ \not{4}\ \ \ \ \\ -\,1\ \ 6 \\ \hline \end{array}$$

Also, you should remember that any number subtracted from itself will be zero.

Examples:

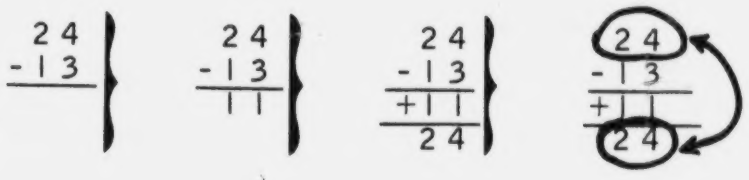
$$\begin{array}{r} 8 \\ -8 \\ \hline 0 \end{array} \qquad \begin{array}{r} 5 \\ -5 \\ \hline 0 \end{array} \qquad \begin{array}{r} 12 \\ -12 \\ \hline 0 \end{array} \qquad \begin{array}{r} 0 \\ -0 \\ \hline 0 \end{array} \qquad \begin{array}{r} 1 \\ -1 \\ \hline 0 \end{array}$$

Here are some practice problems with zeros in them.

	A	B	C	D
1.	tens ones 1 6 - 0	tens ones 2 9 - 1 0	tens ones 4 8 - 2 0	tens ones 5 0 - 2 5
2.	tens ones 7 0 - 6 0	tens ones 3 0 - 1 5	tens ones 7 5 - 7 0	tens ones 6 0 - 5 7

Boy! We almost forgot about proving our work! With subtraction it's not too hard — in fact, it's quite easy. All you do is add your answer to the lower row of numbers. If your addition answer is the same as the top row of numbers, your problem is correct.

Example:



Since your addition answer, 24, is the same as the top-row number, 24, your subtraction is correct. After a little practice, you will be able to prove your subtraction quickly and practice your addition at the same time!

Here are some problems already completed. Prove them to see if they are correct.

(1) $\begin{array}{r} 72 \\ -52 \\ \hline 20 \end{array}$

(2) $\begin{array}{r} 89 \\ -42 \\ \hline 47 \end{array}$

(3) $\begin{array}{r} 14 \\ -\ 9 \\ \hline 5 \end{array}$

(4) $\begin{array}{r} 67 \\ -33 \\ \hline 34 \end{array}$

(5) $\begin{array}{r} 24 \\ -15 \\ \hline 11 \end{array}$

(6) $\begin{array}{r} 90 \\ -56 \\ \hline 44 \end{array}$

Did you find any mistakes?_____

What problems were wrong?_____

Copy the wrong problems here and do them correctly. (Be sure to prove your work.)

Let's skate on over to the problems on the next page.

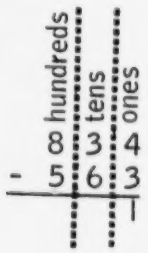
My Correct Answers _____

Best score is 25 correct answers.
Fair score is 18-22 correct answers.
(For the best score, prove your work)

	A	B	C	D	E
1.	tens ones 3 2 - 1 4	tens ones 3 5 - 1 7	tens ones 6 2 - 4 5	tens ones 4 3 - 1 9	tens ones 7 7 - 3 8
2.	4 5 - 1 8	4 3 - 2 6	5 0 - 1 6	7 1 - 5 4	7 4 - 3 7
3.	5 6 - 2 8	3 3 - 1 4	4 4 - 2 9	3 6 - 1 8	7 4 - 2 6
4.	6 4 - 1 5	5 2 - 2 7	4 1 - 2 3	6 1 - 3 2	7 2 - 4 3
5.	3 2 - 2 5	3 7 - 1 9	6 6 - 2 8	7 2 - 3 4	8 4 - 5 9

When we are subtracting large numbers, we can borrow from the "hundreds" column in the same way as we did from the "tens" column.

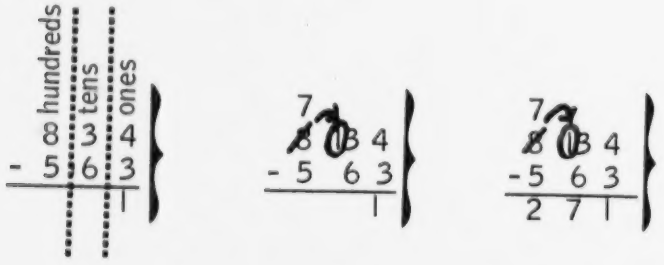
Example:



In this problem we need to borrow to make the top number in the "tens" column larger. This time we borrow one "hundred" and change it to 10 tens. When we add this to our top number we have

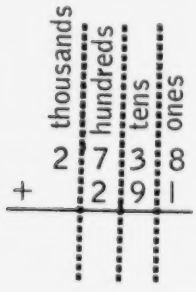
3 groups of ten
+ 10 groups of ten
13 groups of ten

The problem now looks like this:



Prove this problem.

When numbers get even larger than hundreds, they go into a fourth column. This column we call "thousands," because 10 groups of 100 is 1,000. This is true if we are adding or if we are subtracting.



Borrowing from the "thousands" column is done exactly like all our other borrowing.

Example:

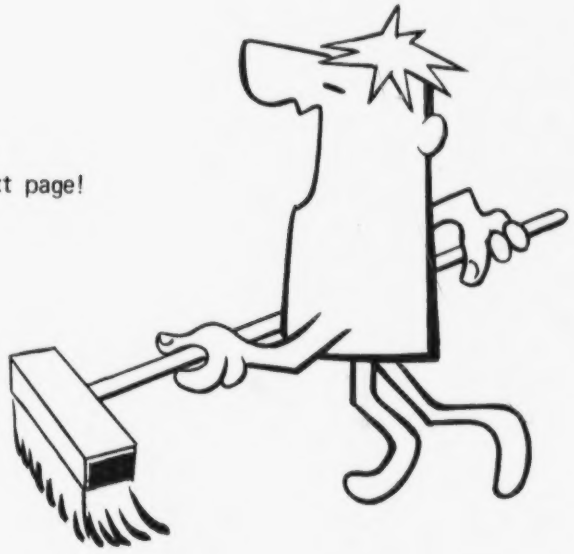
thousands	hundreds	tens	ones
3	6	5	0
- 1	7	4	0
		1	0

thousands	hundreds	tens	ones
2			
~~3~~	16	5	0
- 1	7	4	0
		1	0

thousands	hundreds	tens	ones
2			
~~3~~	16	5	0
- 1	7	4	0
1	9	1	0

On the next few pages are some practice problems. Do your best.

Let's see you make a clean sweep
of the problems on the next page!



My Correct Answers _____

Best score is 30 correct answers.
Fair score 20-25 correct answers.
(Prove your work)

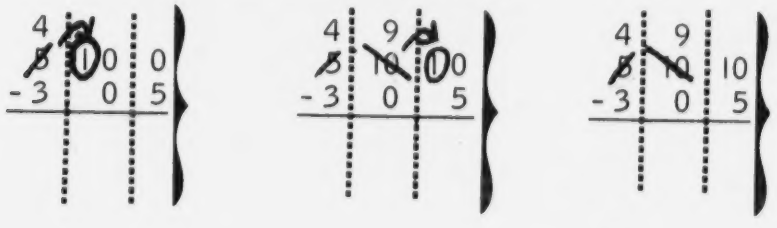
	A	B	C	D	E
1.	48 -29	83 -37	73 -44	64 -25	92 -73
2.	175 -37	123 -19	177 -48	184 -46	146 -28
3.	126 -65	156 -82	119 -44	143 -80	135 -94
4.	107 -35	140 -62	126 -77	132 -73	193 -6
5.	9161 -8150	4306 -2540	9276 -5737	7205 -2783	
6.	6215 -1702	9375 -4827	8769 -4782	4377 -2308	
7.		6362 -4305	7053 -4709		

My Correct Answers _____

Best score is 20 correct answers.
Fair score is 16 -18 correct answers.
(Prove your work)

	A	B	C	D
1.	3227 -1709	3695 - 708	4970 - 365	4356 -2070
2.	3807 -2372	9635 - 47	5632 -4092	6278 -1390
3.	$83.37 - 56.88	$92.62 - 61.85	$41.20 - 13.74	$71.44 - 48.69
4.	$33.46 - 25.06	$53.20 - 10.64	$71.55 - 22.68	$40.28 - 31.08
5.	$133.14 - 64.69	$171.23 - 82.65	$326.30 - 250.60	$500 - 305

Did you have trouble borrowing in the last problem? If so look at this:



Finish the problem now.

Since the number zero (0) means none, it is very difficult to borrow when there is nothing from which to borrow!

Here is another example:

$$\begin{array}{r} 904 \\ -226 \\ \hline \end{array}$$

In this problem you must borrow to make the 4 larger, but can you borrow from 0? No! You must start your borrowing all the way over in the "hundreds" column, like this:

Suppose we try some of these problems where you have to borrow from a column with a zero in it. This will be good practice for you, so do your very best work.

The wise old owl knows all the answers. Do you know the answers on the next page?

My Correct Answers _____

Best score is 25 correct answers.
Fair score is 18-20 correct answers.
(If your score is below 16 correct, you need more practice.)

	A	B	C	D
1.	405 -287	901 -283	603 -275	803 -269
2.	720 -255	840 -377	580 -379	640 -439
3.	500 -275	400 -265	400 -298	700 -369
4.	800 -689	406 -247	508 -239	705 -238
5.	304 -198	606 -268	805 -239	906 -138
6.	$40.05 - 3.62	$70.04 - 25.78	$70.40 - 48.69	$300.60 - 250.60

7.

$500.00
- 305.49

My Correct Answers _____

Best score is 28 correct answers.
Fair score is 20-25 correct answers.
(Prove your work)

	A	B	C	D
1.	4325 -1462	4315 -2841	9827 -3258	6714 -3251
2.	7325 -4175	8972 -3256	4783 -1639	5238 -4735
3.	9378 -2726	4764 -2592	3156 -1281	4327 -2172
4.	7314 -2132	4732 -2571	5621 -2372	4367 -3275
5.	4297 -2763	7352 -2471	5734 -2356	3278 -1439
6.	3241 -2562	4573 -2486	3254 -2168	3225 -2631
7.	4436 -2851	4251 -2348	2361 -1111	2486 -2361

My Correct Answers _____

Best score is 25 correct answers.
Fair score is 18-20 correct answers.
(Prove your work!)

	A	B	C	D
1.	4306 -2547	9276 -5737	7205 -2783	6215 -1702
2.	9375 -4827	$780.72 - 286.43	$960.53 - 178.21	$8.37 - 7.84
3.	$369.48 - 230.72	$820.97 - 347.60	$807.45 - 385.26	$6.53 - 3.47
4.	$760.45 - 327.53	$680.49 - 329.75	$876.07 - 438.42	$9.99 - 5.49
5.	3.50 -1.75	9.80 -3.98	7.50 -3.96	6.89 -2.93

I have five dollars ($5.00) to spend. How much change should I get in each of these problems?

A train ticket to Philadelphia, $3.11. $_____

A pair of gloves for $3.89. $_____

A steak sandwich and coke for 85¢ $_____

Two tickets for the movies for $3.18 $_____

A phonograph record album, $4.49. $_____

Before we go to work on some reading problems, here are some vocabulary words that will help you to know when to subtract.

Difference – "What is the difference between 10 and 15?"

Deduct – "The boss deducted $10 from $15."

Remove – "Remove 10 from 15."

Less than – "Ten is less than 15 by ––"

How much more
How many more } "Fifteen is how many more than 10?"

Take off
Take away
Took off
Took away } "Take off 10 inches from 15."

Try these next reading problems, remembering to look for the vocabulary words printed above. Underline all of the vocabulary words.

These are practice problems for everyone.

1. Jim is saving for a jacket that costs $15.95. He has saved $4.75 so far. How much more does he need to buy the jacket? $_____.

2. Sharon earns $60.00 a week. Her boss deducts $12.73 for taxes. How much does she have left? $_____.

3. Find the difference between $7.85 and $8.75. $_____.

4. Roger measures 6 inches less than David in height. If David is 78 inches tall, how tall is Roger? _____ inches tall.

5. Shirley was told by her doctor to go on a diet. She is to take off 10 pounds. If Shirley weighs 155 pounds now, how much will she weigh after the diet? _____ lbs.

6. Sal had $179.23 in the bank. If he removed $125.00, how much did he have left in the bank? $_____.

These problems will be of interest to boys.

1. Before going hunting, Mike bought a box of 24 shotgun shells. He used 16 shells on the hunting trip. How many shells did he have left? _____.

2. Harry's team scored 65 points in a basketball game after school. Harry scored 12 points in regular baskets and 4 points in foul shots. How many points did he score altogether? _____ pts. How many points did his teammates score? _____ pts.

3. Jimmy wants to buy a new car that costs $2,195. The salesman will allow Jim $1,100 on a "trade-in" of his old car. How much more than the trade-in will Jim have to pay for the new car? $_____.

4. Our baseball team played 25 games. They won 14 and tied 2 games. How many games did they lose? Lost _____games.

5. John wants to buy a doll for his little sister that costs $2.98. If John has only $2.09, how much more does he need to get the doll? $_____.

These problems will be of interest to girls.

1. On Saturdays, the beauty shop of a big department store charges only $2.98 for a wash and set. If Susan has $2.09 on Thursday, how much more will she need to have her hair washed and set on Saturday? $_____

2. Pretend that today is July 14th. How many days will it be until it's August 1st? _____days.

3. Cynthia bought a blouse for $2.49. How much change should she receive from $5.00? $_____

4. Helen collects savings stamps. She now has 78 pages of them. The lamp that she wants takes 100 pages. How many more pages of stamps does she need? _____pages.

5. Mary Ann's father wants to buy a new car that costs $2,195. The salesman will deduct $1,100 from the cost if her father will trade in their old car. How much more money will Mary Ann's father need to pay for the car if he trades in their old car? $_____.

These problems will be of interest to boys.

1. Bill's grandfather was 81 years old this week. In what year was he born? _____

2. In last year's basketball tournament, our team played with just five players. The team scored 93 points. Four of the boys scored a total of 59 points. How many points did the other boy score? _____pts.

3. The "star" player of the team needs only 39 points more to score 1,000 points. How many points has he scored so far? _____pts.

4. The Auto Body Shop needed a part for an old car they were repairing. The car shop wanted $14.00 for the part. The boys asked the Metal Shop to help, and they made the part for $4.50 (the cost of the metal they used). How much did the Auto Body Shop save on this repair part? $_____

5. A club had a picnic and 15 boys and 24 girls went. If the club has 45 members, how many members stayed home?_____.

These problems will be of interest to girls.

1. The Girls' Vocational Department and the "Girls' Talk" Club put on a fashion show. They earned $125.25 from selling tickets. If the cost of decorations, refreshments, and programs was $43.80, how much profit did they make? $_____.

2. The cooking class made two dozen peach pies for the fashion show. The guests ate 19 of them. How many pies were left? _____pies.

3. Cathy is reading a mystery book from the library. She has read 465 pages so far. If the book has 650 pages, how many more pages does she have to read? _____

4. Peggy is 18 years old; her aunt is 37 years old. How much older than Peggy is her aunt? _____years.

5. In two weeks of work in the coat factory, Lynn was able to bring home $90.50. After deducting the cost of transportation and lunches, Lynn put $74.75 in the bank. How much did her lunches and transportation cost? $_____.

This monkey is happy because he got an A on his quiz. Let's see how you do on the next page!

QUIZ

	A	B	C	D
1.	323 -270	701 - 69	460 -432	56.5 -49.3
2.	196 -178	154 -116	307 -100	812 -746
3.	345 -102	143 -108	300 -187	422 -379
4.	350 -304	340 -205	573 -296	847 -339
5.	3114 -2067	2161 -1161	5000 -4876	3401 -1178
6.	$341.51 - 181.14	$500.43 - 463.05	$6,840.10 - 3,274.59	

Fill in this "magic square" so that each row and each of the columns adds up to 15.

8		6
4		2

HALT! Are you sure you understand addition and subtraction? If not, you should go back and do the problems again. If you understand addition and subtraction, you may go on to multiplication.

CHAPTER III – MULTIPLICATION

MULTIPLICATION

The person in charge of the snack bar ordered 8 boxes of candy. There were 24 candy bars in each box. How many candy bars were there altogether?

Looking at a problem like this, you have a choice of two ways of finding the answer.

Addition	or	Multiplication
24		24
24		x 8
24		
24		
24		
24		
24		
+ 24		

It really makes no difference to the snack-bar manager which method you use, since both ways will give you the same answer. But there is a great deal of difference TO YOU. Whenever you have a problem where the same number is **repeated** many times, it is much easier and faster to multiply it by the number of times it is repeated.

Example: Richard works part time after school. He works 4 hours a day, 5 days a week. How many hours a week does he work?

In this problem the number to be repeated is 4. The number of times it is repeated is 5. Therefore we can set the problem in this way:

4 (hours each day)
x5 (days worked in a week)
(hours worked in a week)

Example:

Karen was told to put two boxes of eggs in each of the seven refrigerators in the cooking classrooms. How many boxes of eggs must she get from the kitchen to do this job?

In this problem we are talking about boxes of eggs. So we find out that the number to be repeated is 2 (boxes), and the times it is repeated will be 7 (the number of refrigerators). So our problem looks like this:

2 (boxes in each refrigerator)
x7 (the number of refrigerators)
(the total number of boxes)

Before we go any further, we had better understand one thing, and that is PRACTICE. No person can be really good at anything without practice. You can't play baseball, basketball, or field hockey, or knit, dance, or anything else unless you practice, practice, practice!

Do you get the point? You must practice mathematics to be fast and accurate. You practice driving to be a good driver; you practice drawing to be a good artist; you must practice to be a good student.

On the next pages are practice problems in multiplication. Some will be easy for you, but maybe others will not. If you can do them easily, good! But if any of these are hard for you to do, practice, and then practice some more.

Multiplication is very important in mathematics. If you do not learn the "multiplication tables," you will never be able to divide, or work with fractions and decimals. It may even keep you from getting a job later on in your life.

Don't **you** be a dunce:
PRACTICE YOUR MATH!

These are the multiplication tables from 1 to 9.

×1.	1 × 1	2 × 1	3 × 1	4 × 1	5 × 1	6 × 1	7 × 1	8 × 1	9 × 1
×2.	1 × 2	2 × 2	3 × 2	4 × 2	5 × 2	6 × 2	7 × 2	8 × 2	9 × 2
×3.	1 × 3	2 × 3	3 × 3	4 × 3	5 × 3	6 × 3	7 × 3	8 × 3	9 × 3
×4.	1 × 4	2 × 4	3 × 4	4 × 4	5 × 4	6 × 4	7 × 4	8 × 4	9 × 4
×5.	1 × 5	2 × 5	3 × 5	4 × 5	5 × 5	6 × 5	7 × 5	8 × 5	9 × 5
×6.	1 × 6	2 × 6	3 × 6	4 × 6	5 × 6	6 × 6	7 × 6	8 × 6	9 × 6
×7.	1 × 7	2 × 7	3 × 7	4 × 7	5 × 7	6 × 7	7 × 7	8 × 7	9 × 7
×8.	1 × 8	2 × 8	3 × 8	4 × 8	5 × 8	6 × 8	7 × 8	8 × 8	9 × 8
×9.	1 × 9	2 × 9	3 × 9	4 × 9	5 × 9	6 × 9	7 × 9	8 × 9	9 × 9

My Correct Answers _____

Best score is 48 correct answers.
Fair score is 40-45 correct answers.
(If you score less than 36 correct, you need practice!)

	A	B	C	D	E	F
1.	3 x 2	1 x 3	2 x 2	4 x 3	7 x 3	2 x 5
2.	3 x 1	5 x 2	5 x 4	1 x 2	6 x 3	3 x 7
3.	3 x 3	7 x 2	8 x 3	4 x 6	6 x 2	3 x 4
4.	7 x 4	2 x 6	2 x 1	5 x 3	2 x 8	5 x 1
5.	4 x 4	1 x 1	1 x 4	2 x 3	6 x 4	2 x 7
6.	3 x 6	8 x 2	6 x 1	2 x 4	3 x 5	4 x 2
7.	4 x 1	3 x 8	4 x 5	3 x 9	8 x 4	9 x 2
8.	2 x 9	4 x 7	9 x 4	4 x 8	9 x 3	4 x 9

My Correct Answers _____

Best score is 48 correct answers.
Fair score is 40-45 correct answers.
(If you score below 36 correct, you must practice!)

	A	B	C	D	E	F
1.	6 x 6	8 x 7	5 x 9	8 x 4	7 x 3	4 x 9
2.	7 x 7	7 x 5	9 x 8	6 x 8	6 x 7	8 x 5
3.	5 x 6	9 x 7	8 x 8	9 x 9	7 x 8	5 x 5
4.	7 x 6	5 x 7	9 x 5	3 x 8	8 x 9	6 x 9
5.	5 x 8	7 x 9	4 x 7	4 x 8	8 x 6	4 x 6
6.	9 x 6	3 x 7	3 x 9	7 x 8	7 x 9	6 x 8
7.	6 x 7	8 x 8	8 x 9	7 x 9	9 x 6	8 x 7
8.	6 x 6	7 x 5	9 x 8	9 x 5	6 x 9	9 x 9

My Correct Answers _____

Best score is 45 correct answers.
Fair score is 40-43 correct answers.
(If your score is below 38, you need more practice.)

	A	B	C	D	E	F
1.	5 x 2	8 x 2	2 x 4	2 x 6	3 x 2	7 x 2
2.	2 x 9	1 x 2	3 x 3	4 x 4	5 x 5	4 x 3
3.	5 x 3	5 x 4	6 x 3	6 x 4	7 x 5	6 x 5
4.	8 x 5	7 x 3	7 x 4	8 x 3	8 x 4	9 x 3
5.	9 x 4	9 x 5	5 x 1	7 x 1	4 x 1	1 x 8
6.	1 x 3	6 x 1	9 x 1	1 x 1	6 x 6	7 x 6
7.	7 x 7	8 x 6	8 x 7	9 x 6	9 x 7	8 x 8
8.	9 x 8	9 x 9	2 x 2			

Multiplying by 9 is fun. We will set up a table like this:

9 x 0 = 0

9 x 1 = 9

9 x 2 = 1_

9 x 3 = 2_

9 x 4 = 3_

9 x 5 = 4_

9 x 6 = 5_

9 x 7 = 6_

9 x 8 = 7_

9 x 9 = 8_

After the first two multiplications, we just filled in the numbers from 1 through 8.

Now, start over again and do the same thing, but go up instead of down, starting with the last number. Fill in the numbers from 1 through 8. This is what your table will look like:

9 x 0 = 0

9 x 1 = 9

9 x 2 = 18

9 x 3 = 27

9 x 4 = 36

9 x 5 = 45

9 x 6 = 54

9 x 7 = 63

9 x 8 = 72

9 x 9 = 81

Let's look at one of these problems: 9x3.

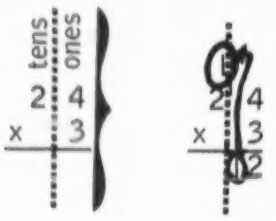
The answer (27) starts with a 2, which is **one number smaller** than the 3 we are multiplying by. And the other number in the answer (7), is equal to 9-2.

Try the same trick with 9x8.

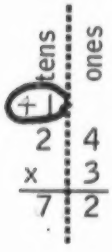
Does this work for every number multiplied by 9? Try it and see.

As we did with our other work, we will separate our numbers into "ones," "tens," "hundreds," and so on. That is, we will **carry** groups of ten from one column to another.

Example: Multiply 24 X 3.



We start with 3x4. We know 3x4=12, which is 1 group of ten plus 2 ones. We put down the 2 and carry the 1 group of ten. We will add the 1 in **after** we do the next part of the multiplication.

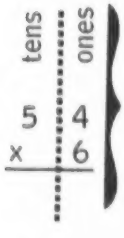


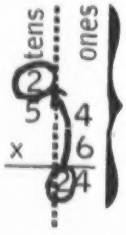
What we said to ourselves was this:

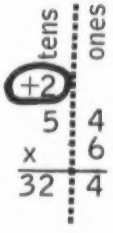
3x2=6 plus 1 = 7

(The 7 is placed in the answer.)

Take a look at this example:





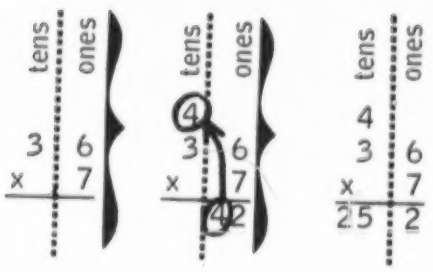


6x4=24. Put down the 4, carry the 2.

Next, 6x5=30, plus 2 = 32

(The 32 is placed in the answer.)

How about this one?



7x6=42. Put down the 2, carry the 4.

7x3=21, plus 4 = 25

(The 25 is placed in the answer.)

O. K. It's practice time again. Remember to do your best work.

This man thinks that he is strong.
How strong are you in math?
Let's see by doing the problems on the next page!

My Score _____

Best score is 25 correct answers.
Fair score is 18-20 correct answers.

	A	B	C	D
1.	74 x 2	91 x 5	42 x 4	93 x 3
2.	62 x 4	38 x 5	37 x 6	74 x 3
3.	89 x 2	52 x 7	63 x 8	75 x 5
4.	81 x 4	56 x 5	49 x 3	86 x 4
5.	47 x 7	78 x 6	94 x 4	65 x 3

6. $(6 \times 3) + 2 =$

7. $(9 \times 2) + 5 =$

8. $(8 \times 5) + 6 =$

9. $(7 \times 4) + 5 =$

10. $(5 \times 9) + 3 =$

My Score _____

Best score is 30 correct answers.
Fair score is 20-25 correct answers.

	A	B	C	D	E
1.	35 x 4	69 x 6	59 x 3	47 x 9	61 x 4
2.	67 x 3	69 x 7	78 x 8	81 x 3	58 x 9
3.	35 x 6	92 x 8	68 x 9	56 x 8	94 x 7
4.	59 x 6	72 x 7	49 x 8	26 x 5	78 x 4
5.	55 x 8	24 x 9	29 x 7	28 x 4	32 x 5

6. $(6 \times 9) + 6 =$

7. $(4 \times 7) + 9 =$

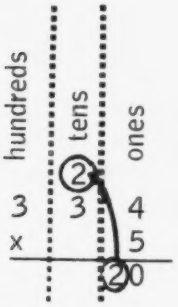
8. $(5 \times 9) + 3 =$

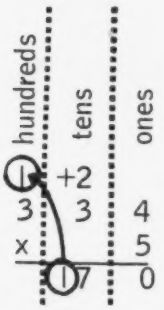
9. $(3 \times 5) + 5 =$

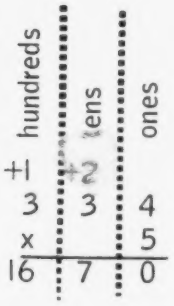
10. $(9 \times 2) + 8 =$

There is no real problem to multiplying larger numbers if you carry correctly.

Example:







(5 x 3 = 15 + 2 = 17 (5 x 3 = 15) + 1 = 16

Even when the number gets very large, you continue to carry when you need to.

Once again, let us talk about our old friend Zero. Any number multiplied by zero will be zero.

Examples:

8	7	9	1	6	5	2	3
x0	x0	x0	x0	x0	x0	x0	x0
0	0	0	0	0	0	0	0

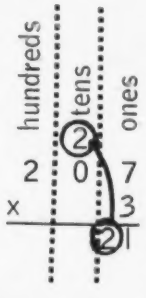
Zero multiplied by a number is also zero.

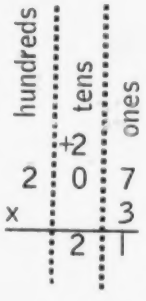
Examples:

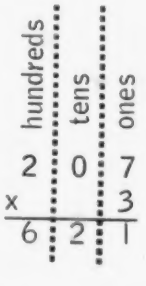
0	0	0	0	0	0	0	0	0
x8	x9	x7	x6	x1	x5	x3	x4	x2
0	0	0	0	0	0	0	0	0

Now when you are carrying, you may multiply a zero, and you get zero, **but you still must add the number you carried.**

Example:

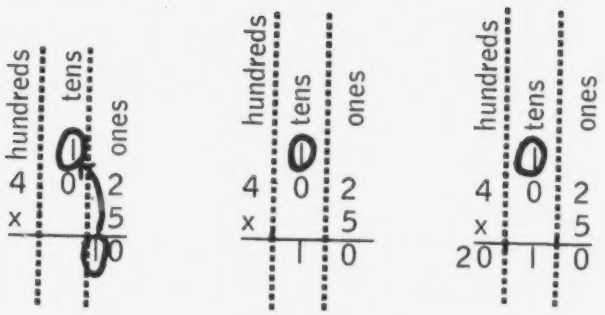






In this problem we know that 3x0=0. But then we add the carried number $\begin{array}{r} 2 \\ +0 \\ \hline 2 \end{array}$ and we get our answer, 2.

Follow this example:



This man is running to plug his thinking cap in.
Do you have your thinking cap on
for the problems on the next page?

My Score _____

Best score is 35 correct anwers.
Fair score is 23-25 correct answers.
(If your score is 20 or below, you need practice!)

	A	B	C	D	E
1.	50 x 5	60 x 6	70 x 7	80 x 8	90 x 9
2.	80 x 7	90 x 8	80 x 9	70 x 6	60 x 9
3.	400 x 9	707 x 8	900 x 7	550 x 8	660 x 9
4.	700 x 6	980 x 8	505 x 9	809 x 5	608 x 9
5.	807 x 7	609 x 4	708 x 6	505 x 5	909 x 8
6.	606 x 9	770 x 8	605 x 4	209 x 6	406 x 7
7.	580 x 6	990 x 5	508 x 6	670 x 7	404 x 7

Boys and girls make most of their mistakes because they do not know the multiplication tables. The next thing that gives them trouble is multiplying by two numbers or three numbers. Up to now we have used only single numbers to multiply by. But – that's really all you do when multiplying by two or more numbers!

Example:

$$\begin{array}{r} 325 \\ \times\ 12 \\ \hline \end{array}$$

What we do in this problem is really multiply by 2 and then by 1.

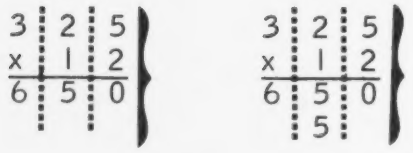
$$\begin{array}{r} 325 \\ \times\ \ 2 \\ \hline \end{array} \quad \text{and then} \quad \begin{array}{r} 325 \\ \times\ 1 \\ \hline \end{array}$$

Follow the example:

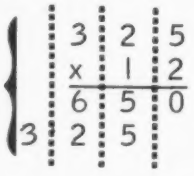
First – multiply by 2:

This finishes the first part.

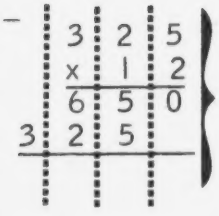
Next – multiply by 1:



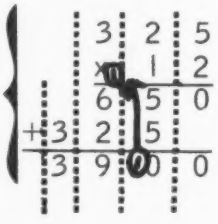
Note that we place the first number right under the 1.



Last – add:



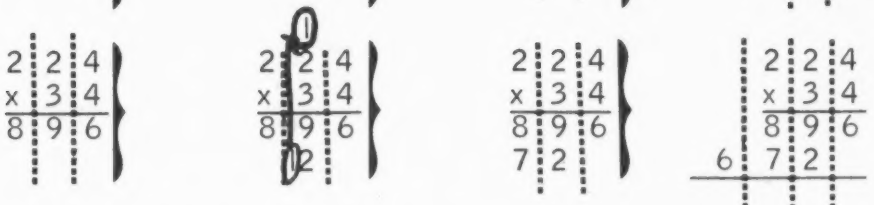
Now that we have finished multiplying, we add to get the answer.



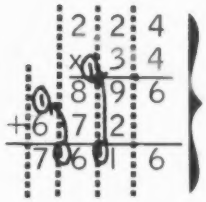
Here's another example:

Step #1:

Step #2:



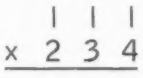
Step #3:



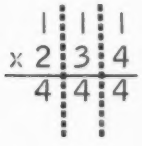
Remember to keep your numbers in line.

Write this next problem down and follow the example step by step.

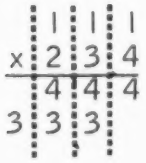
Example:



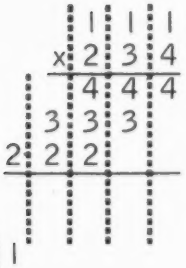
Step #1 – Multiply by 4:



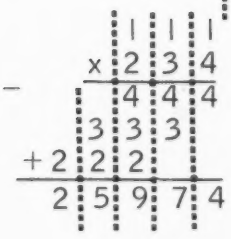
Step #2 – Multiply by 3:



Step #3 – Multiply by 2:



Step #4 – Add:



Notice how each row of numbers in the answer starts **under** the number that you are multiplying by.

```
  1 1 1
x 2 3 4
  4 4 4
```

```
  1 1 1
x 2 3 4
  4 4 4
3 3 3
```

```
  1 1 1
x 2 3 4
  4 4 4
3 3 3
2 2 2
```

Do these practice problems now, so you can get help if you need it.

```
  3 2
x 4 1
```

```
  1 4 2
x   4 3
```

```
  2 2 2
x   3 4
```

```
  7 3 2
x   2 3
```

```
  4 0 1
x 4 3 3
```

```
  5 2 0
x 5 6 4
```

Let's march on over to the problems on the next page.

My Score _____

Best score is 30 correct answers.
Fair score is 20-25 correct answers.
(If you score below 18 correct, you need more practice.)

	A	B	C	D	E
1.	21 x 56	98 x 14	75 x 25	61 x 15	51 x 51
2.	89 x 89	64 x 33	61 x 59	46 x 34	97 x 54
3.	77 x 67	86 x 15	91 x 19	88 x 77	65 x 23
4.	57 x 23	46 x 35	74 x 39	78 x 36	97 x 49
5.	85 x 85	74 x 47	74 x 55	83 x 39	46 x 39
6.	95 x 50	58 x 38	97 x 70	70 x 31	52 x 40

Remember that multiplying a number by zero gives zero (Row #6 - A, C, E).

My Score _____

Best score is 30 correct answers.
Fair score is 20-25 correct answers.
(If your score is below 18 correct, you need more practice!)

	A	B	C	D	E
1.	36 x 23	57 x 22	84 x 43	68 x 41	96 x 52
2.	87 x 52	95 x 42	76 x 40	97 x 21	68 x 40
3.	47 x 20	96 x 40	75 x 33	65 x 20	74 x 24
4.	84 x 12	65 x 25	67 x 42	93 x 71	78 x 62
5.	79 x 54	89 x 45	67 x 44	39 x 16	78 x 45
6.	46 x 25	79 x 39	57 x 36	88 x 73	57 x 35

My Score _____

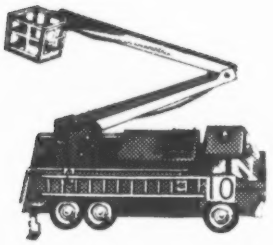
Best score is 30 correct answers.
Fair score is 20-25 correct answers.
(If your score is below 18 correct, you need more practice!)

	A	B	C	D	E
1.	45 x 38	59 x 37	96 x 42	81 x 25	67 x 43
2.	79 x 40	57 x 49	70 x 49	46 x 27	54 x 32
3.	76 x 22	63 x 41	91 x 45	83 x 29	47 x 30
4.	76 x 40	92 x 47	56 x 29	93 x 26	90 x 40
5.	75 x 38	65 x 27	72 x 30	83 x 24	82 x 36
6.	40 x 32	80 x 20	50 x 39	30 x 37	80 x 53

My Score _____

Best score is 30 correct answers.
Fair score is 20-25 correct answers.
(If you score below 20, you need more practice!)

	A	B	C	D	E
1.	98 x 40	76 x 44	57 x 35	96 x 30	98 x 67
2.	78 x 43	49 x 25	79 x 37	57 x 36	88 x 73
3.	91 x 78	61 x 27	72 x 39	93 x 20	46 x 29
4.	63 x 10	37 x 18	72 x 44	47 x 38	97 x 68
5.	45 x 26	95 x 12	84 x 42	67 x 30	82 x 23
6.	70 x 32	90 x 52	70 x 62	30 x 22	48 x 12



I bet some of you are wondering what happened to old #10. Well, here he comes now to show you how to prove your multiplication. Let's take a look at this problem:

$$\begin{array}{r} 206 \\ \times\ 23 \\ \hline 618 \\ +\ 412 \\ \hline 4738 \end{array}$$

To prove this problem, we add the top row of numbers: 2 + 0 + 6 = **8**. Now we add the next row: 2 + 3 = **5**. Multiply these two numbers:

$$\begin{array}{r} 8 \\ \times\ 5 \\ \hline 40 \end{array}$$

Your answer is more than 10, so add 4 + 0 = **4**. Now add your answer to the multiplication problem. Does it come to (4?)

4 + 7 + 3 + 8 = 22 → 2 + 2 = (4)

Both numbers are the same so your answer is correct.

Follow this next example:

$$\begin{array}{r} 634 \\ \times\ 234 \\ \hline 2536 \\ 1902 \\ +1268 \\ \hline 148356 \end{array}$$

634 → 13 → (1 + 3) = 4

234 → 9 = × 9

36 → (3 + 6) = (9)

148356 → 27 → (2 + 7) = (9)

Did you follow that? Good, let's try one together.

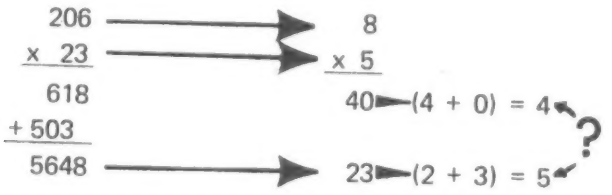
$$\begin{array}{r} 362 \\ \times\ 217 \\ \hline 2534 \\ 362 \\ +724 \\ \hline 78554 \end{array}$$

Try this one too!

$$\begin{array}{r} 372 \\ \times 207 \\ \hline 2604 \\ 000 \\ +744 \\ \hline 77004 \end{array}$$

Do you know how smart you're getting? No? Well, you will be able to prove your multiplication. And if you find you made a mistake, you can also tell where the mistake is!

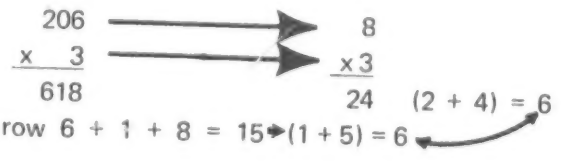
Take this problem again and we will make a mistake.



We can tell that something is wrong because the 5 does not match the 4 . To find our mistake, we start the same way by adding up our top number.

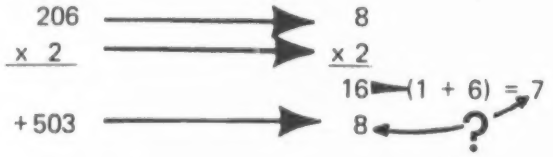
$$2 + 0 + 6 = 8$$

Now we multiply this number by our first number. Like this:



Now add the first row $6 + 1 + 8 = 15 \rightarrow (1 + 5) = 6$

You see that 6 and 6 are the same, so this part is correct. Go on to the next number and do the same thing:



Since 8 and 7 are not the same, our mistake is in this row. See how smart you are!!

Suppose we prove a few problems that have mistakes, so you can practice what you have just learned. O. K.?

(1)
$$\begin{array}{r} 356 \\ \times\ 91 \\ \hline 356 \\ +3304 \\ \hline 33396 \end{array}$$

(2)
$$\begin{array}{r} 567 \\ \times\ 345 \\ \hline 2835 \\ 2268 \\ +1801 \\ \hline 205615 \end{array}$$

(3)
$$\begin{array}{r} 232 \\ \times\ 146 \\ \hline 1392 \\ 928 \\ +232 \\ \hline 33772 \end{array}$$

Don't let the problems on the next page throw you!

My Score _____

Best score 20 correct answers.
Fair score 15-18 correct answers.
(For best score, prove your work!)

	A	B	C	D
1.	193 x 74	253 x 53	471 x 80	764 x 53
2.	735 x 82	394 x 80	372 x 86	193 x 37
3.	374 x 83	254 x 85	382 x 92	295 x 93
4.	522 x 93	386 x 96	672 x 90	463 x 54
5.	573 x 72	286 x 65	356 x 72	473 x 60

My Score _____

Best score is 20 correct answers.
Fair score is 15 - 18 correct answers.
(For best score, prove your work)

	A	B	C	D
1.	284 x 91	865 x 71	251 x 57	815 x 91
2.	536 x 94	763 x 51	172 x 87	512 x 93
3.	454 x 75	227 x 45	735 x 82	467 x 53
4.	374 x 81	352 x 53	391 x 74	374 x 38
5.	328 x 29	295 x 39	368 x 69	627 x 20

My Score _____

Best score is 20 correct answers.
Fair score is 15-18 correct answers.
(For the best score, prove your work)

	A	B	C	D
1.	861 x 93	701 x 92	671 x 90	821 x 43
2.	731 x 34	931 x 68	912 x 37	812 x 63
3.	911 x 45	171 x 32	701 x 35	901 x 67
4.	510 x 40	961 x 38	814 x 17	261 x 70
5.	517 x 42	514 x 38	169 x 83	179 x 39

Let me show you something else about the number 10. Did you know that, when you multiply by 10, you do not have to think to find your answer? All you have to do is copy!

Example:
$$\begin{array}{r} 987 \\ \times\ 10 \\ \hline \end{array}$$

With most problems we would write out two full lines, like this:
$$\begin{array}{r} 987 \\ \times\ 10 \\ \hline 000 \\ +987 \\ \hline 9{,}870 \end{array}$$

But with 10, all you have to do is write "0" under the zero in the problem, like this:
$$\begin{array}{r} 987 \\ \times\ 10 \\ \hline 0 \end{array}$$

Now copy the top row of numbers in the problem, like this:
$$\begin{array}{r} 987 \\ \times\ 10 \\ \hline 9{,}870 \end{array}$$

Hey, how about that! A correct answer (prove it yourself!) and look how fast it was. All without any "brain" work.

Compare these two problems.

A
$$\begin{array}{r} 754 \\ \times\ 10 \\ \hline 000 \\ +754 \\ \hline 7{,}540 \end{array}$$

B
$$\begin{array}{r} 754 \\ \times\ 10 \\ \hline 7{,}540 \end{array}$$

The same idea works with 100 also.

Example:
$$\begin{array}{r} 987 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} 987 \\ \times 100 \\ \hline 00 \end{array}$$

$$\begin{array}{r} 987 \\ \times 100 \\ \hline 98{,}700 \end{array}$$

It even works with 1,000!

Example:
$$\begin{array}{r} 9876 \\ \times 1000 \\ \hline \end{array}$$

$$\begin{array}{r} 9876 \\ \times 1000 \\ \hline 000 \end{array}$$

$$\begin{array}{r} 9876 \\ \times 1000 \\ \hline 9{,}876{,}000 \end{array}$$

How about a million? Sure thing!

Example:

$$3568453 \times 1000000$$

$$3568453 \times 1000000 = 000000$$

$$3568453 \times 1000000 = 3{,}568{,}453{,}000{,}000$$

Now you can work for the United States Government. These are the kinds of numbers they work with when they spend money!

How about some practice?

$$125 \times 10$$

$$394 \times 10$$

$$684 \times 100$$

$$7984 \times 1000$$

$$9999 \times 100$$

$$79881 \times 1000$$

Now let us look at this problem:

$$345 \times 203$$

First we multiply by the 3 1035
Then we multiply by the 0 000
Then we multiply by the 2 690
Then we add 70,035

When multiplying by 10, we found that we could save a lot of time and work by just writing in the zero and then copying the number. We can do the same sort of thing in this kind of problem.

$$345 \times 203$$

First we multiply by the 3 1035
Then we write in the 0 and multiply by 2 in the same line 6900
Then we add 70,035

Now try these on your own:

$$123 \times 401$$

$$617 \times 50$$

$$921 \times 107$$

$$605 \times 308$$

My Score _____

Best score is 20 correct answers.
Fair score is 15-18 correct answers.
(Prove all your work)

	A	B	C	D
1.	735 x202	182 x164	476 x301	371 x384
2.	356 x253	371 x204	384 x295	376 x280
3.	735 x301	317 x348	584 x352	725 x364
4.	418 x309	862 x570	325 x100	682 x256
5.	674 x302	592 x339	348 x296	815 x319

My Score _____

Best score is 20 correct answers.
Fair score is 15-18 correct answers.
(Prove all your work)

	A	B	C	D
1.	563 x492	375 x271	542 x303	537 x273
2.	348 x290	851 x193	348 x206	295 x390
3.	647 x293	259 x100	235 x407	826 x175
4.	148 x200	257 x364	548 x235	317 x384
5.	365 x325	713 x308	476 x315	753 x280

My Score _____

Best score is 20 correct answers.
Fair score is 15-18 correct answers.
(To improve your work, prove your work)

	A	B	C	D
1.	4005 x 326	7053 x 709	3605 x 798	4970 x 365
2.	3807 x 372	9560 x 470	6278 x 390	5632 x 902
3.	1350 x 175	2980 x 398	3750 x 396	1689 x 293
4.	4709 x 368	5732 x 403	2805 x 736	4732 x 439
5.	8900 x 286	1973 x 539	3832 x 576	3798 x 300

These problems will be of interest to girls.

1. Shirley is paid $1.50 an hour. She worked four hours. How much did she earn? $_____$

2. If your father buys four dress shirts that cost $5.95 each, how much will he pay for the four shirts? $_____$

3. The Power Machine Shop is making baby bibs. If a girl can make 31 bibs an hour, how many can she make in 5 hours? _____ bibs

4. The pink erasers we use in class cost 10¢ each. What will nine erasers cost? $____$

5. Two of the girls walked into town last Saturday. They walked four miles in one hour. How far did they walk if they walked for two hours? _____ miles

These problems will be of interest to boys.

1. A pro-football player practices 185 hours each season. If there are 34 players on the team, how many "man-hours" does the team practice in a season? _____ man-hours

2. A certain shirt costs $5.95. How much would you pay for four shirts? $_____$

3. The boys in the Print Shop are stapling the School News. If Kevin staples 31 books an hour, how many can he staple in five hours? _____ books

4. The pencils we use in class cost 10¢ each. How much would nine pencils cost? $_____$

5. Les and Dick took a long walk (hike) last Saturday. They walked 5 miles in an hour. How far did they walk in 3 hours? _____ miles.

These problems will be of interest to boys.

1. The Ford plant in Mahwah, New Jersey turns out 40 cars an hour. If the **average value** of each car is $2,675, what is the value of one hour's production? $_____

2 a. The Auto Body Shop buys paint thinner in half-gallon cans at $1.65 each. How much would a case of 12 cans cost? $_____

b. If the Auto Body Shop could buy the same paint thinner in one-gallon cans at $2.95 each, how much would a case of six cans cost? $_____

c. Since the case of 12 half-gallon cans holds the same amount as the case of 6 one-gallon cans, would it cost more or less to buy thinner in one-gallon cans?

_____

3. If you work eight hours a day and are paid $1.75 an hour, how much do you earn in one day? $_____

These problems will be of interest to girls.

1. There are 27 hospitals and nursing homes in New Jersey that employ Home Nursing graduates. If each hospital or home employs 16 girls, how many girls are working in home nursing? _____

2 a. A school kitchen prepares 223 breakfasts each day. If there are 180 school days a year, how many breakfasts are prepared by the kitchen in a year? _____

b. If each breakfast costs $1.09, how much do all the breakfasts cost? $_____

c. If 2 cups of milk are served with each breakfast, how many cups of milk are served each year? _____ cups

3. If you work eight hours a day and you are paid $1.45 an hour, how much do you earn a day? $_____

These problems will be of interest to boys.

1. Rick's father is a pilot for United Airlines. He flys 2,740 miles a day. How many miles does he fly in a week if he works four days a week? _____ miles

2. The boys in Floriculture planted 98 rows of carnations. If there are 450 carnations in a row, how many carnations did the boys plant? _____

3. The Metal Shop buys its brazing rod by the **gross.** If there are 12 rods in a dozen, and 12 dozen in a gross, how many rods are in 5 gross? _____ rods

4. A bricklayer built a long wall. He laid 6 bricks to a square foot. If the wall had 1,550 square feet, how many bricks did he lay? _____

5. If you work 40 hours a week, 50 weeks a year, how many hours a year do you work? _____ hours.

These problems will be of interest to girls.

1. If flour costs 13¢ a pound, how much will a 25 lb. bag of flour cost? $_____

2. In Dressmaking we buy pins by the **gross.** If there are 12 pins in a dozen, and 12 dozen in a gross, how many pins are there in 5 gross? _____

3. When the girls finish baking cookies, they place them in the freezer. If they put 13 cookies in a row, 8 rows in a layer, and 2 layers in a box, how many cookies does the box hold? _____

4. A case of canned pears contains 24 cans. How many cans would 46 cases hold? _____

5. Ann is knitting a scarf. So far she had knitted 59 rows of 35 stitches. How many stitches has she completed?

These problems will be of interest to boys.

1 a. The boys in the Cabinet Shop are putting in a new tile floor. If there are 33 rows of tile and each row has 24 tiles in it, how many tiles are needed for the new floor? _____ tiles

b. Each tile costs 17¢. How much does this new floor cost? S_____

2. The Upholstery Shop completed 8 couches. If you bought these couches in a store, each one would cost $375. What is the total value of the couches? S_____

3. My house has 15 old-style windows in it. If each window has 12 panes of glass, how many panes of glass are in these windows? _____

4. Each year we plant evergreens to replace the trees used at Christmas for decorations. Right now we have 59 rows of 35 trees each. How many evergreen trees do we have? _____

You have been working so hard that its time to have a little fun. Here are two Math tricks you can pull on your friends.

Finding A Birthday

Have your friend write down the following where you cannot see it:

1. Write down the **number** of the **month** of his birth
2. Multiply it by 2
3. Add 5 to it
4. Multiply this by 50
5. Subtract the number of days in a year (365)
6. Add the **day** of his birthday
7. Write the final (last) answer on a paper and give it to you.

Now you add 115 to the number you receive. In your answer, the first number or numbers is the month and the next number or numbers is the birth date! For example, if the answer you get is 831, read this as 8–31, or August 31. The answer 1205 is 12–05 or December 5.

This trick works for any day of the year, but if your friend's birthday is in January, he will get stuck when he has to subtract 365 from the number 350. So if his birthday is in January have him pick another date.

Here's another one for your family or friends.
Find someone who has fewer (less) than 10 brothers, 10 sisters, and 10 uncles. Ask him to do this problem on paper.

1. Multiply the number of his brothers by 2.
2. Add 3 to it.
3. Multiply by 5.
4. Add 7 to this.
5. Add the number of sisters he has.
6. Multiply by 2.
7. Add 3.
8. Multiply by 5.
9. Add the number of uncles he has.
10. Write the final number on a paper and give it to you.

Now you subtract 235 from the number. Your answer will be 3 numbers long. The first number is the number of brothers, the second number is the number of sisters, and the last number is the number of uncles. (This trick works even when the number of brothers or sisters or uncles equals zero. It even works when ALL the numbers equal zero.)

You will be so smart that your family will think you are wonderful!

* * * * * * *

Soon we will discuss something that many of the girls and boys think is a great big **mystery**. Division is not really as hard as people say.

We know that **multiplication** is a fast way to **add** many numbers that are the same. Well, **division** is a fast way to **subtract** many numbers that are the same. Also, division uses many of the same ideas as multiplication. So if you know your multiplication tables and understand subtraction, you are well on the way to doing division.

In multiplication we say, "How much is two 8's? ($2 \times 8 = ?$) We know that $2 \times 8 = 16$. In division we say, "How many 8's in 16?" ($8\overline{)16}$) Here we should quickly remember from our multiplication table that $2 \times 8 = 16$. Then we know that there are **two** 8's in 16.

Feeling strong? Try wrestling with the problems on the next page!

See if you can do these problems. Find the missing number.

1. $7 \times ___ = 56$
2. $___ \times 7 = 56$
3. $9 \times ___ = 81$
4. $___ \times 8 = 72$
5. $3 \times ___ = 21$
6. $___ \times 4 = 12$
7. $5 \times ___ = 25$
8. $___ \times 9 = 81$
9. $9 \times ___ = 72$
10. $___ \times 7 = 21$
11. $3 \times ___ = 12$
12. $___ \times 5 = 25$
13. $5 \times ___ = 15$
14. $___ \times 6 = 18$
15. $9 \times ___ = 27$
16. $___ \times 3 = 15$
17. $3 \times ___ = 18$
18. $___ \times 3 = 27$

Try these; they are a little different.

1. $___ \times ___ = 16$
2. $___ \times ___ = 16$
3. $___ \times ___ = 14$
4. $___ \times ___ = 12$
5. $___ \times ___ = 12$
6. $___ \times ___ = 21$
7. $___ \times ___ = 18$
8. $___ \times ___ = 18$
9. $___ \times ___ = 24$
10. $___ \times ___ = 36$
11. $___ \times ___ = 28$
12. $___ \times ___ = 9$
13. $___ \times ___ = 10$
14. $___ \times ___ = 15$
15. $___ \times ___ = 20$
16. $___ \times ___ = 20$
17. $___ \times ___ = 25$
18. $___ \times ___ = 27$
19. $___ \times ___ = 35$
20. $___ \times ___ = 40$

EXTRA CREDIT PROBLEMS

1. A carpenter did a job building a new set of cellar stairs. The materials cost $79.56 and he worked 4½ days, 8 hours a day. He charged $5.25 per hour for his work. How much money did the customer owe him? $_____

2. A bank teller closed her "window" at the end of the day. As she counted her money she had 623 20-dollar bills, 135 tens, 119 fives, 148 ones, and 102 50-cent pieces, 141 quarters, 92 dimes, 54 nickels and 72 pennies. How much money did she have? $_____

3. Jerry went to Korvette's and bought items for 56¢, 39¢, $1.19 and 49¢. How much change should Jerry receive from a five dollar bill? $_____

4. Tommy bought some life insurance last year. He paid $19.00 for $1,000 of insurance. At that price, how much would it cost to buy $2,000 of insurance? _____

   $5,000 of insurance? _____ $10,000 of insurance? _____

5. The Senior Class gets 10¢ profit on each 50¢ candy bar they sell. If the class sold 735 bars, how much did they collect? _____ How much was their profit? _____

1. A state spent $3,990 in a certain year on each pupil in a special school. If there were 547 students in that school that year, how much did it cost the state? $____

2. If you were a pupil at that school from four years of age, and graduated at 20 years, how much did it cost the state to give you your education, if the **average** yearly cost was $3,500? $_____ (The "average" cost means that some years the cost was higher, and some years it was lower, but in general the cost came to about that amount)

3. You may not believe it, but a truck averages only about 40 miles per hour on the highway. At that speed, how long would it take a truck to travel 560 miles?_____

4. Last summer Ken bought 100 cantaloupes for 15¢ each. He sold 20 of them for 25¢ each, he sold another 50 at 20¢ each, and then had to throw away the rest because they spoiled. Did he make money or lose money? _____

5. The Alaskan Alcan Highway is about 1,500 miles long. At an average speed of 45 m.p.h., how long would it take to drive the full length of the highway? _____

1. The new house up the street from school has a basement in it. The hole that was dug for the basement measured 40′ long by 30′ wide by 9′ deep. How many cubic yards of dirt did the contractor remove?
   (a) No. of cubic yards is the volume (v).
   (b) Use the formula v = lwh (length x width x height)
   (c) Make h = the depth of the hole.
   (d) There are 27 cubic feet in a cubic yard.

   _____

2. The contractor kept half of the dirt at the house. The rest he sold at $5.50 a cubic yard to another contractor. How much did he receive for the dirt he sold?
   $_____

3. The contractor used some of the dirt that he kept to fill a hole measuring 9′ x 10′ x 9′. How many cubic yards of dirt did he use to fill the hole?_____

4. The owner asked the contractor to cover the front lawn of the new house with 3″ of the dirt. If the lawn measured 50′ x 20′, how many cubic **feet** did they need?
   _____

1. It costs the school 7.5 cents a pound for potatoes. How much would the school pay for 100 pounds? _____

2. Apples weigh 48 pounds a bushel. How many pounds would a truckload of 100 bushels weigh? _____

3. A local company pays 15.5 cents a gallon for fuel oil. How much did the company pay for a delivery of 1,000 gallons of oil? _____

4. A bakery paid $2.69 a sack for flour. What did they pay for 100 sacks? _____

5. The local service station sells 1,000 quarts of oil a month. If the average cost is 35¢ a quart, what is the value of the month's oil sales? _____

6. Multiply each number by: —

		10	100	1,000
(a)	6			
(b)	89			
(c)	15			
(d)	2.3			

1. The school team won its first basketball game 74 to 70. What was the total number of points scored in the game? _____ If the playing time was 48 minutes, how many points were scored per minute on the average? _____

2. The Philadelphia Eagles began a game on their 20-yard line. On the next four plays they gained 5 yards, lost 7 yards, gained 15 yards, and gained 6 yards. If "time out" is called, on what yard line is the ball? _____ The next four plays lost 3, gained 5, gained 6, and gained 10. Where is the ball now?

   _____

3. Floor tiles measure 9" x 9" How many square inches of floor will 100 tiles cover?

4. Mr. Pierson averages 14 miles per gallon of gasoline in his car. How far could he travel on 11 gallons?

5. The passenger ship U.S.S. United States used to go to England each week. It carried 1,000 crewmen, 904 first-class passengers, 524 cabin-class passengers, and 554 tourist-class passengers. How many people could this ship carry to England, including its crew?

HOLD IT! You had better know your multiplication well, before going on to division. If you have done well on your problems, you may proceed.

CHAPTER IV – DIVISION

One very important thing you should learn right now is that you must do division **step by step.** When you start taking shortcuts, you will make mistakes.

In a division problem, one number is called the divisor and the other is the dividend. They look like this:

divisor)dividend

In the problem $3\overline{)6}$, the 3 is the divisor and the 6 is the dividend. Look at these problems and name the parts.

$2\overline{)8}$ 2 is the _____; 8 is the _____

$3\overline{)12}$ 3 is the _____; 12 is the _____.

$5\overline{)15}$ _____ is the divisor; 15 is the _____

$6\overline{)30}$ _____ is the divisor; ___is the dividend.

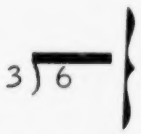
$8\overline{)24}$ _____ is the dividend;____is the divisor.

To do a division problem, you ask yourself "How many ( )'s in ( )?" Take a look at these division problems.

1. $3\overline{)6}$ (How many 3's in 6?)
2. $4\overline{)8}$ (How many 4's in 8?)
3. $6\overline{)24}$ (How many 6's in 24?)
4. $8\overline{)48}$ (How many 8's in 48?)

In dividing, you must **compare** numbers to see which is larger. You can divide easily if the first number of the dividend is larger than the divisor. (Problem #1 and #2). If the divisor is larger, you then use the **first two** numbers of the dividend. In Problem #3, the 6 (divisor) is larger than the first number of the dividend (2). We then use the first two numbers (24). Since 24 is larger than 6, you can now divide. The same is true of problem #4. The 8 is larger than the 4 in the dividend, so we cannot divide 8 into 4. But 8 is **not** larger than 48, so we can easily divide 8 into 48.

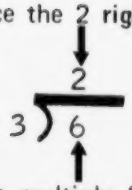
Now let's complete a problem step by step:



(How many 3's in 6?) (3 x ? = 6)

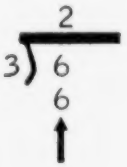
Since we know from multiplication that 3 x **2** = 6, our answer is 2.

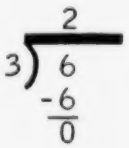
We place the 2 **right over** the "6"



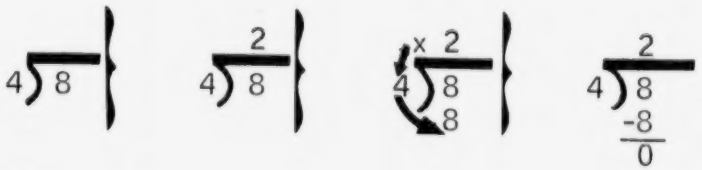
Now we multiply 2 x 3 (

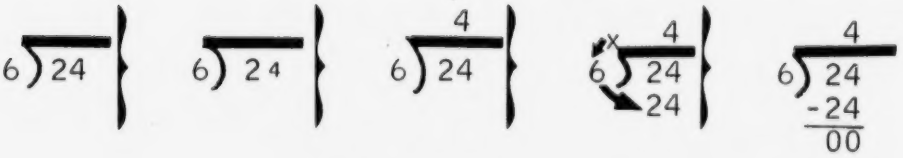
)

Since 2 x 3 = 6, we place this 6 **under** the 6 in the dividend. 

We subtract at this time. 

We can now understand that 3 divides into 6 **evenly**. (There are two 3's in 6 **with nothing left over**.)

Follow this problem step by step 

And this one: 

Try this one $8\overline{)48}$

On the next pages are some practice problems for you to do. You do not have to **write** each step, as we did with the ones above, but you should **think** about them step by step, as we have done.

If you think she has problems,
take a look at the next page!

My Score _____

Best score is 24 correct answers.
Fair score is 18-20 correct answers.
(If your score is below 15, you need more practice.)

	A	B	C
1.	$2\overline{)16}$	$2\overline{)8}$	$4\overline{)32}$
2.	$1\overline{)2}$	$2\overline{)12}$	$4\overline{)24}$
3.	$3\overline{)12}$	$1\overline{)6}$	$3\overline{)15}$
4.	$3\overline{)27}$	$2\overline{)10}$	$4\overline{)36}$
5.	$1\overline{)5}$	$1\overline{)8}$	$3\overline{)6}$
6.	$4\overline{)12}$	$3\overline{)21}$	$2\overline{)6}$
7.	$4\overline{)20}$	$1\overline{)3}$	$4\overline{)8}$
8.	$2\overline{)18}$	$1\overline{)7}$	$3\overline{)24}$

My Score _____

Best score is 24 correct answers.
Fair score is 18-20 correct answers.
(If your score is below 15, you need practice.)

	A	B	C
1.	$4\overline{)28}$	$2\overline{)14}$	$4\overline{)16}$
2.	$1\overline{)4}$	$3\overline{)18}$	$2\overline{)4}$
3.	$3\overline{)9}$	$6\overline{)24}$	$6\overline{)18}$
4.	$8\overline{)16}$	$5\overline{)10}$	$7\overline{)28}$
5.	$6\overline{)6}$	$8\overline{)32}$	$5\overline{)5}$
6.	$7\overline{)56}$	$6\overline{)48}$	$7\overline{)21}$
7.	$9\overline{)63}$	$7\overline{)63}$	$7\overline{)14}$
8.	$6\overline{)36}$	$8\overline{)24}$	$9\overline{)36}$

My Score _____

Best score is 24 correct answers,
Fair score is 18-20 correct answers.
(If your score is below 15, you need practice.)

	A	B	C
1.	$5\overline{)35}$	$9\overline{)72}$	$6\overline{)12}$
2.	$5\overline{)40}$	$7\overline{)42}$	$5\overline{)25}$
3.	$9\overline{)18}$	$5\overline{)15}$	$8\overline{)64}$
4.	$7\overline{)7}$	$9\overline{)45}$	$8\overline{)40}$
5.	$6\overline{)24}$	$8\overline{)56}$	$7\overline{)49}$
6.	$6\overline{)54}$	$6\overline{)42}$	$9\overline{)81}$
7.	$5\overline{)30}$	$8\overline{)72}$	$6\overline{)30}$
8.	$5\overline{)45}$	$9\overline{)54}$	$8\overline{)48}$

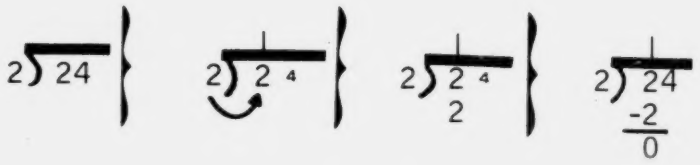
My Score _____

Best score is 24 correct answers.
Fair score is 18-20 correct answers.
(If your score is below 15, you need practice.)

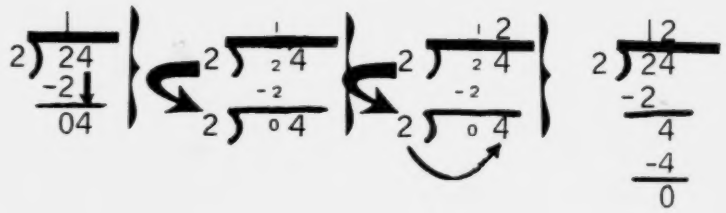
	A	B	C
1.	$7\overline{)49}$	$6\overline{)54}$	$9\overline{)36}$
2.	$8\overline{)32}$	$7\overline{)56}$	$9\overline{)54}$
3.	$9\overline{)72}$	$8\overline{)48}$	$9\overline{)27}$
4.	$7\overline{)28}$	$6\overline{)42}$	$8\overline{)64}$
5.	$8\overline{)40}$	$7\overline{)42}$	$9\overline{)45}$
6.	$8\overline{)72}$	$6\overline{)48}$	$7\overline{)35}$
7.	$9\overline{)81}$	$6\overline{)36}$	$7\overline{)63}$
8.	$8\overline{)24}$	$8\overline{)56}$	$9\overline{)63}$

As our ⟌dividend gets larger there is no reason to worry. We look at one number at a time.

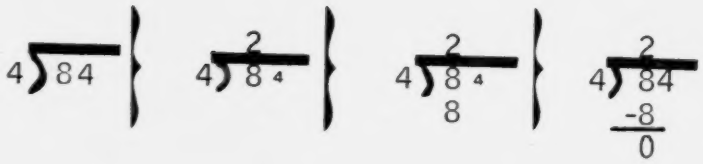
Example:

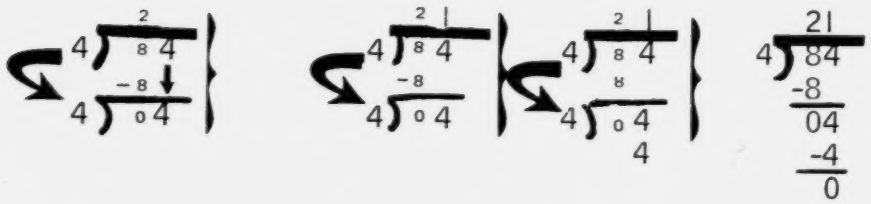


Now at this point, **we bring the next number in the dividend down,** and then we divide it by the divisor.

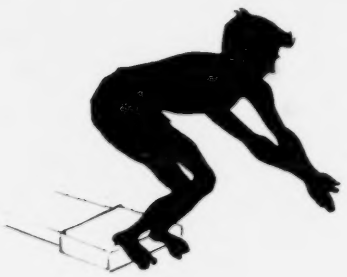


Follow this example:





Let's dive into the problems on the next page.

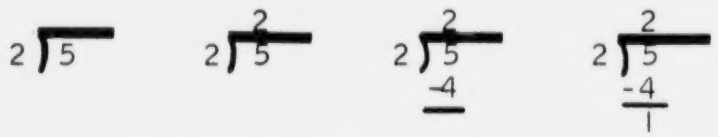


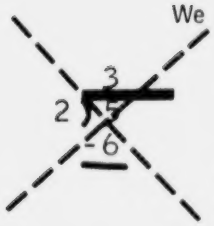
My Score _____

Best score is 24 correct answers.
Fair score is 18-20 correct answers.
(If your score is below 15, you need practice.)

	A	B	C
1.	$3\overline{)63}$	$2\overline{)88}$	$2\overline{)48}$
2.	$5\overline{)55}$	$2\overline{)62}$	$4\overline{)48}$
3.	$3\overline{)39}$	$6\overline{)66}$	$3\overline{)30}$
4.	$4\overline{)44}$	$3\overline{)90}$	$2\overline{)46}$
5.	$3\overline{)36}$	$2\overline{)84}$	$4\overline{)40}$
6.	$4\overline{)80}$	$6\overline{)60}$	$2\overline{)44}$
7.	$4\overline{)88}$	$3\overline{)69}$	$3\overline{)66}$
8.	$5\overline{)50}$	$3\overline{)96}$	$2\overline{)80}$

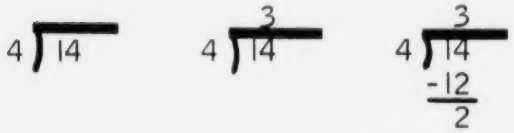
So far all our problems have come out even, with no "remainders" or "leftovers." But suppose it doesn't come out even? Again, there is no reason to worry, since we still do the problem the same way. The important thing in division is to find out how many of the Divisor Number is in the Dividend. Right? O. K., so look at this:



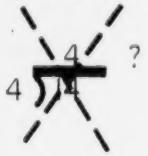


We can see that there are two 2's in 5 with a 1 left over (the remainder). We could not say three 2's because that would be 6, and you cannot subtract 6 from 5. Now here is something to remember. When you multiply your answer by the divisor, if you get a number larger than your dividend, the answer is wrong. The multiplication must be **equal to or less than** the dividend.

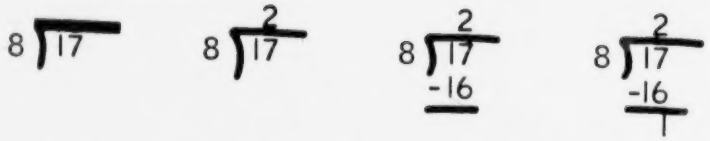
Here is another example:



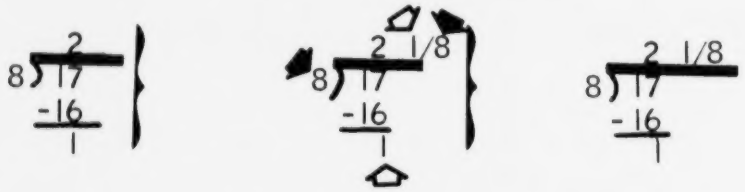
In this problem there are three 4's and a 2 remainder.

Why couldn't our answer have been  ?

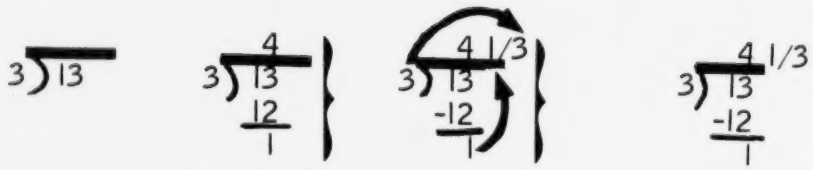
Here is another problem:



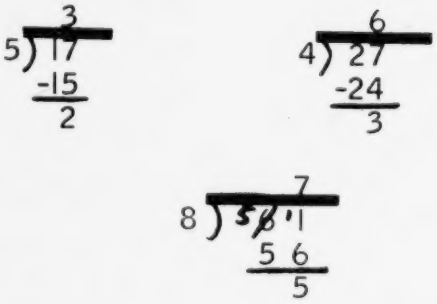
To finish this problem correctly, we need to place the remainder as part of the answer. (So we won't forget it!) To do this, we place the remainder next to the answer and put the divisor under it. Like this:



Look at this:



Place these remainders in the answer correctly



The old witch has brewed up some problems for you on the next page!

My Score _____

Best score is 24 correct answers.
Fair score is 18-20 correct answers.
(If your score is below 15, you need practice.)

	A	B	C
1.	$4\overline{)13}$	$2\overline{)13}$	$4\overline{)25}$
2.	$3\overline{)11}$	$5\overline{)14}$	$3\overline{)23}$
3.	$7\overline{)37}$	$4\overline{)19}$	$2\overline{)15}$
4.	$9\overline{)38}$	$2\overline{)19}$	$8\overline{)42}$
5.	$3\overline{)13}$	$6\overline{)43}$	$4\overline{)34}$
6.	$4\overline{)17}$	$5\overline{)34}$	$6\overline{)25}$
7.	$7\overline{)45}$	$8\overline{)57}$	$7\overline{)36}$
8.	$3\overline{)16}$	$6\overline{)14}$	$2\overline{)11}$

My Score _____

Best score is 24 correct answers.
Fair score is 18-20 correct answers.
(If you score below 15, you need more practice.)

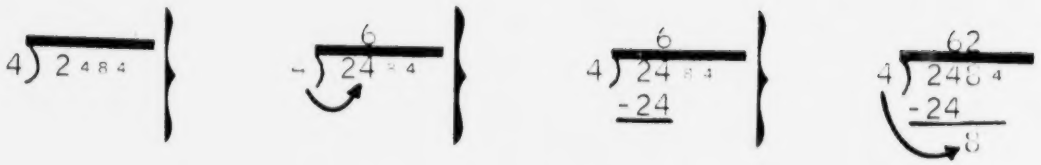
	A	B	C
1.	$3\overline{)17}$	$2\overline{)17}$	$4\overline{)15}$
2.	$5\overline{)13}$	$3\overline{)20}$	$6\overline{)19}$
3.	$7\overline{)23}$	$3\overline{)14}$	$8\overline{)18}$
4.	$4\overline{)18}$	$5\overline{)16}$	$8\overline{)19}$
5.	$4\overline{)33}$	$6\overline{)21}$	$7\overline{)40}$
6.	$5\overline{)17}$	$9\overline{)28}$	$5\overline{)42}$
7.	$3\overline{)22}$	$6\overline{)28}$	$4\overline{)23}$
8.	$7\overline{)29}$	$8\overline{)35}$	$7\overline{)40}$

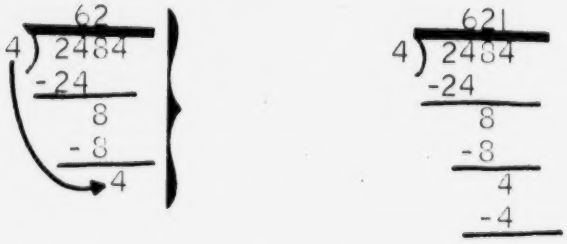
Very often we have to divide into large numbers. First we will try this with single number division.

Example: $3\overline{)126}$

Just remember to compare each number with the divisor.

Follow this one: $4\overline{)2484}$





The little owl is asking
"whooo" can do the problems on the next page?

My Score _____

Best score is 24 correct answers.
Fair score is 18-20 correct answers.
(If your score is below 15, you need more practice.)

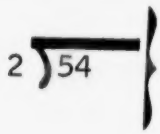
	A	B	C
1.	$7\overline{)357}$	$6\overline{)486}$	$9\overline{)549}$
2.	$3\overline{)216}$	$8\overline{)408}$	$2\overline{)248}$
3.	$4\overline{)248}$	$5\overline{)205}$	$7\overline{)427}$
4.	$5\overline{)255}$	$3\overline{)189}$	$9\overline{)729}$
5.	$6\overline{)246}$	$8\overline{)728}$	$4\overline{)168}$
6.	$7\overline{)567}$	$5\overline{)105}$	$3\overline{)156}$
7.	$5\overline{)305}$	$6\overline{)126}$	$7\overline{)147}$
8.	$9\overline{)189}$	$6\overline{)546}$	$4\overline{)128}$

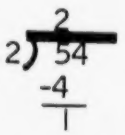
My Score_____

Best score is 24 correct answers.
Fair score is 18–20 correct answers.
(If your score is below 15, you need more practice.)

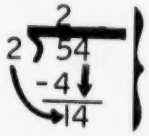
	A	B	C
1.	$8\overline{)248}$	$6\overline{)426}$	$5\overline{)155}$
2.	$4\overline{)364}$	$6\overline{)306}$	$9\overline{)459}$
3.	$3\overline{)1269}$	$9\overline{)819}$	$5\overline{)455}$
4.	$6\overline{)186}$	$3\overline{)2496}$	$8\overline{)168}$
5.	$7\overline{)217}$	$3\overline{)2736}$	$7\overline{)637}$
6.	$2\overline{)1048}$	$8\overline{)328}$	$5\overline{)555}$
7.	$2\overline{)1228}$	$4\overline{)2048}$	$9\overline{)279}$
8.	$7\overline{)497}$	$8\overline{)488}$	$4\overline{)2884}$

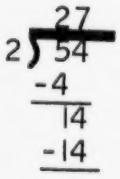
Let's take one of our sample problems from before, $2\overline{)5}$. If you remember, this problem has a remainder of 1. Now let's make the dividend into a longer number, 54, and solve this new problem.





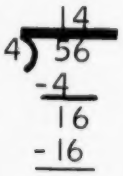
At this point we bring the 4 down beside our remainder and we have 14. Divide this by the divisor:



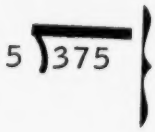


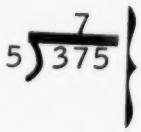
This is our completed problem.

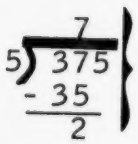
What you have just seen and followed is called **carrying** in division. It's really not hard, is it? Suppose we follow another problem where we carry.

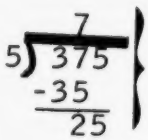


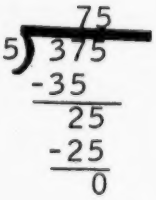
Another one? O. K.











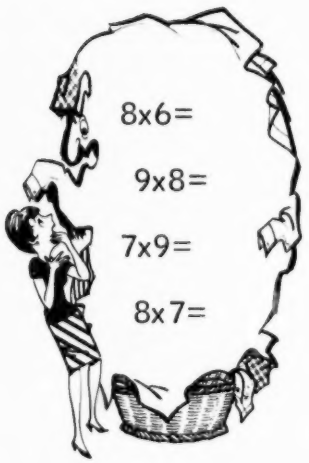
Try these samples:

$6\overline{)222}$

$8\overline{)352}$

$3\overline{)201}$

Don't let the problems
on the next page
scare you!



My Score _____

Best score is 24 correct answers.
Fair score is 18-20 correct answers.
(If your score is below 15, you need more practice.)

	A	B	C
1.	$9\overline{)288}$	$6\overline{)534}$	$7\overline{)364}$
2.	$5\overline{)445}$	$9\overline{)405}$	$5\overline{)315}$
3.	$7\overline{)168}$	$2\overline{)136}$	$8\overline{)512}$
4.	$4\overline{)136}$	$6\overline{)156}$	$3\overline{)135}$
5.	$5\overline{)460}$	$4\overline{)213}$	$6\overline{)224}$
6.	$8\overline{)217}$	$7\overline{)163}$	$4\overline{)140}$
7.	$7\overline{)389}$	$9\overline{)732}$	$4\overline{)387}$
8.	$9\overline{)415}$	$3\overline{)140}$	$9\overline{)315}$

My Score _____

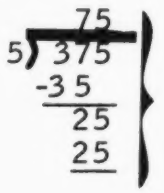
Best score is 24 correct answers.
Fair score is 18-20 correct answers.
(If your score is below 15, you need more practice.)

	A	B	C
1.	$8\overline{)128}$	$4\overline{)388}$	$6\overline{)334}$
2.	$3\overline{)201}$	$5\overline{)172}$	$8\overline{)352}$
3.	$9\overline{)736}$	$6\overline{)222}$	$6\overline{)169}$
4.	$7\overline{)261}$	$2\overline{)131}$	$5\overline{)473}$
5.	$5\overline{)284}$	$6\overline{)566}$	$7\overline{)197}$
6.	$3\overline{)206}$	$3\overline{)106}$	$9\overline{)832}$
7.	$7\overline{)517}$	$8\overline{)395}$	$4\overline{)139}$
8.	$7\overline{)325}$	$6\overline{)114}$	$9\overline{)716}$

The time has come to learn to prove our division. As before, number 10 will help us to prove our work.

Example:

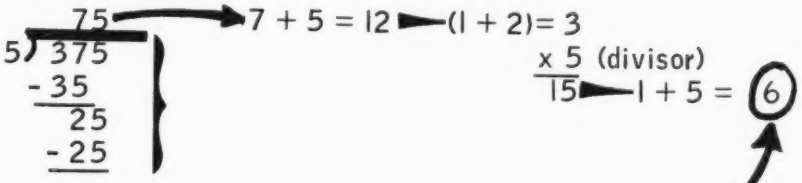
1.



Add your answer $7 + 5 = 12$ → $1 + 2 = 3$

12 is larger than 10, so add

2. Now multiply this number by your divisor.



3. Add your dividend $3 + 7 + 5 = 15$ $[1 + 5] = 6$ and compare.

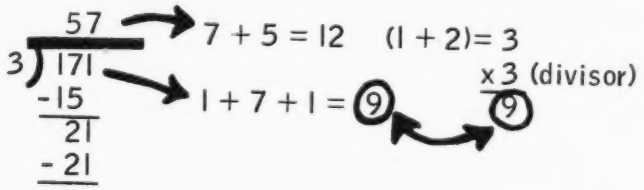
Does it seem difficult? Look at the steps again:

(1) Add your answer.

(2) Multiply by the divisor.

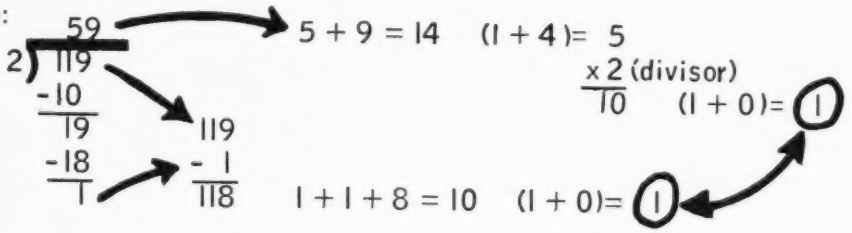
(3) Add your dividend and compare.

Always remember to keep your numbers below 10. Would you like to follow another one?



Now if you have a remainder, you have an extra step to complete. This step is very easy. You subtract your remainder from your dividend **before** you add its numbers up.

Example:



Maybe we had better show you another one.

$$\begin{array}{r} 38 \\ 8\overline{)306} \\ -24 \\ \hline 66 \\ -64 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 306 \\ -\ 2 \\ \hline 304 \end{array}$$

$3 + 8 = 11 \quad (1 + 1) = 2$

$\times 8$

$16 \quad 1 + 6 = 7$

$3 + 0 + 4 = 7$

Prove these examples yourself.

$$\begin{array}{r} 56 \\ 5\overline{)284} \\ -25 \\ \hline 34 \\ -30 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 46 \\ 7\overline{)325} \\ -28 \\ \hline 45 \\ -42 \\ \hline 3 \end{array}$$

There will not be room on the next pages to prove your work, but use another sheet of paper and follow the steps you have learned.

Let's not sit around.
There are problems waiting for you
on the next page.

My Score _____

Best score is 24 correct answers.
Fair score is 18-20 correct answers.
(Prove your work!)

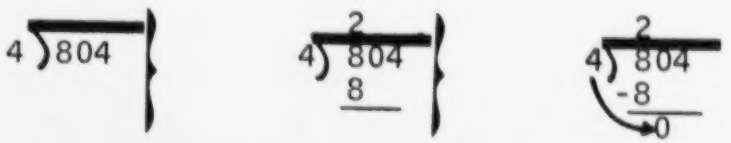
	A	B	C
1.	$6\overline{)566}$	$7\overline{)197}$	$3\overline{)206}$
2.	$3\overline{)106}$	$9\overline{)832}$	$7\overline{)517}$
3.	$5\overline{)284}$	$8\overline{)395}$	$4\overline{)139}$
4.	$7\overline{)325}$	$6\overline{)114}$	$9\overline{)716}$
5.	$5\overline{)436}$	$3\overline{)171}$	$2\overline{)119}$
6.	$6\overline{)279}$	$8\overline{)412}$	$5\overline{)391}$
7.	$7\overline{)658}$	$8\overline{)306}$	$3\overline{)2810}$
8.	$8\overline{)3080}$	$2\overline{)972}$	$5\overline{)2862}$

We did not mean to forget the zero in division. We have been saving it for just this time. The zero comes mainly in two places:

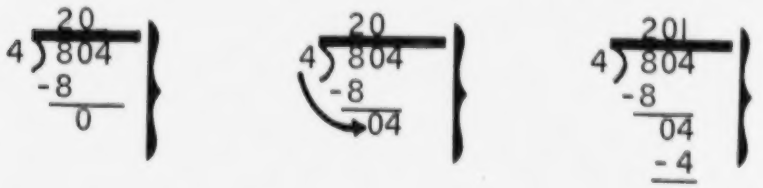
(1) When you have it in your dividend, as in the number 804.

(2) When you have a number that is smaller than your divisor, so it cannot be divided.

Example of type 1:



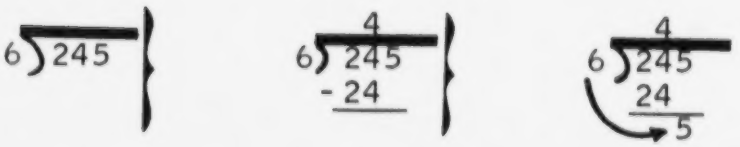
Here we must stop a minute. Since there are **no** 4's in a zero, you place a "0" in your answer. Then bring down the next number — in this case, 4.



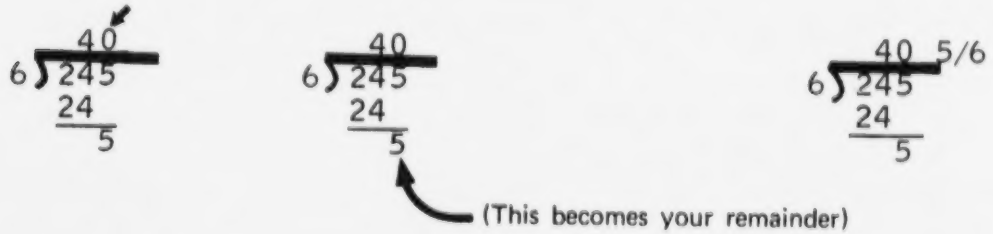
Prove this problem!

Another example of type 1:

Example of type 2:



Again, we must stop. How many times does 6 go into 5? Since there are **no** 6's in 5, you place a 0 in your answer. But this time there is no other number to bring down. Now see what we do.



Another example of type 2:

$3\overline{)627}$

$$\begin{array}{r} 2 \\ 3\overline{)627} \\ -6 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 20 \\ 3\overline{)627} \\ -\,6 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 209 \\ 3\overline{)627} \\ 6 \\ \hline 27 \\ 27 \\ \hline \end{array}$$

This girl is working to make her garden grow.
Now you must work on the following problems
to make your knowledge of mathematics grow!

My Score_____

Best score is 24 correct answers.
Fair score is 18–20 correct answers.
(Prove your work)

	A	B	C
1.	$3\overline{)211}$	$5\overline{)153}$	$4\overline{)83}$
2.	$3\overline{)62}$	$2\overline{)101}$	$6\overline{)181}$
3.	$9\overline{)634}$	$8\overline{)647}$	$4\overline{)162}$
4.	$9\overline{)368}$	$8\overline{)483}$	$6\overline{)543}$
5.	$5\overline{)254}$	$7\overline{)283}$	$3\overline{)272}$
6.	$5\overline{)451}$	$7\overline{)635}$	$9\overline{)816}$
7.	$6\overline{)425}$	$4\overline{)321}$	$9\overline{)724}$
8.	$6\overline{)302}$	$8\overline{)325}$	$5\overline{)351}$

My Score _____

Best score is 24 correct answers.
Fair score is 18-20 correct answers.
(Prove your work)

	A	B	C
1.	$8\overline{)403}$	$4\overline{)483}$	$4\overline{)804}$
2.	$4\overline{)201}$	$8\overline{)645}$	$7\overline{)356}$
3.	$8\overline{)726}$	$6\overline{)361}$	$9\overline{)818}$
4.	$7\overline{)495}$	$9\overline{)630}$	$2\overline{)180}$
5.	$3\overline{)609}$	$6\overline{)301}$	$9\overline{)720}$
6.	$5\overline{)500}$	$7\overline{)632}$	$9\overline{)540}$
7.	$8\overline{)403}$	$6\overline{)505}$	$8\overline{)530}$
8.	$3\overline{)100}$	$7\overline{)280}$	$7\overline{)90}$

We know that numbers do not always divide evenly. Now we will practice getting answers as close as possible to the dividend number. For example, if we are dividing 7 into 59, we cannot say that 7 times a certain number equals 59, but we can come close. We can find two close numbers – one smaller than 59, and one larger – that 7 does go into evenly.

$7\overline{)59}$ $\quad$ (7 x 8) 56 → → 59 ← ← (7 x 9) 63

The closest numbers are 56 (7 x 8) and 63 (7 x 9). Try these sample problems.

Problem		Dividend	
1. $6\overline{)40}$	(6 x 6) 36	40	(6 x 7) 42
2. $8\overline{)52}$	( ) ____	52	( ) ____
3. $5\overline{)24}$	( ) ____	24	( ) ____
4. $9\overline{)24}$	( ) ____	24	( ) ____
5. $7\overline{)48}$	( ) ____	48	( ) ____
6. $9\overline{)76}$	( ) ____	76	( ) ____
7. $8\overline{)47}$	( ) ____	47	( ) ____

My Score _____

Best score is 24 correct answers.
Fair score is 16 -20 correct answers.

1.	$7\overline{)53}$	( ) ____	53	( ) ____
2.	$9\overline{)65}$	( ) ____	65	( ) ____
3.	$8\overline{)39}$	( ) ____	39	( ) ____
4.	$6\overline{)49}$	( ) ____	49	( ) ____
5.	$9\overline{)76}$	( ) ____	76	( ) ____
6.	$8\overline{)34}$	( ) ____	34	( ) ____
7.	$9\overline{)82}$	( ) ____	82	( ) ____
8.	$4\overline{)31}$	( ) ____	31	( ) ____
9.	$7\overline{)67}$	( ) ____	67	( ) ____
10.	$6\overline{)58}$	( ) ____	58	( ) ____
11.	$8\overline{)63}$	( ) ____	63	( ) ____
12.	$9\overline{)80}$	( ) ____	80	( ) ____

These problems will be of interest to boys.

1. Six boys traveled to the Eastern States Basketball Tournament. The total cost for the trip came to $72. How much did the trip cost each boy? $_____

2. The tournament was made up of teams of eight players each. If there were 104 players, how many teams were there? _____

3. The total attendance for the nine games was 2,421 people. What was the average number of people at each game? _____ (The average is the total attendance divided by the number of games.)

4. One of the teams traveled 1,161 miles to play. The players went in a non-stop jet that made the trip in three hours. How many miles did they travel in an hour? _____

5. Bill played in six games and scored 36 points. What was his average score per game? _____

These problems will be of interest to girls.

1. Six girls went to Wildwood last summer and stayed in a hotel for a week. If their total expenses were $390, what did each girl pay? $_____

2. The school paid $27 for gas for two weeks to drive the hockey team to play other schools.
   A. How much did it cost each week? $_____
   B. If the team played three games a week, how much did the gas cost for each game? $_____

3. Helene had test scores of 85, 98, 97, 99, 76, 100, 95, 100. What was her average score? _____ (The average is the total of all the scores divided by the number of tests.)

4. A company gave the school 75 free samples of lipsticks. If they were divided evenly among the three residence buildings, how many lipsticks did each building get? _____

These problems will be of interest to boys.

1. The boys in Print Shop are making writing pads. Each pad is 6" long. How many pads can they cut if their pad stock is 48" in length?

2. The Photoengraving Shop is cutting some zinc "plates" 4" long. If their material comes in 60" lengths, how many "plates" can they cut from one length?

3. The Metal Shop has a new work bench 16 feet long. The boys wish to mark off 3 equal work sections on it. What would be the length of each section? _____ ft. or _____ ft. and _____ inches.

4. The Upholstery Shop is recovering the couches in the Teen Bar. If each cushion takes 1 yard of material, how many cushions can they cut from a bolt of cloth 150 feet long? _____ If each piece of cloth is cut into two: a piece for the top of the cushion and a piece for the bottom, how many pieces of cloth will there be altogether? _____

These problems will be of interest to girls.

1. The girls in Power Sewing are making shop aprons. If the instructor divides 628 pieces of cloth among four girls, how many pieces of cloth does each girl receive?

2. A piece of shelving paper is 48" long. How many shelves can you cover if each shelf takes 12 inches? _____

3. To make a batch of pressed butter cookies takes 3 egg yolks. How many egg yolks will you need to make 150 batches of cookies for the Prom? _____

4. The Home Decorating class wants to cut an old carpet into 3 equal pieces. If the carpet if 16 feet long, what is the measurement for each piece? _____ ft. or _____ ft. and _____ inches.

5. One of our Business Training graduates works in a bank. She earns $78 a week and works a 5-day week. How much does she earn a day? _____

The division problems that bother most people are those where the divisor has two or more numbers. These are a little more difficult than those with a single-number divisor. However, you still are comparing the divisor to the dividend in the same way.

If your divisor has two numbers, you compare it to the first **two** numbers of the dividend. If the dividend numbers are larger, you go ahead and divide. If they are smaller than the divisor, you then compare the divisor to the first **three** numbers of the dividend.

Example #1 $25\overline{)5025}$ $25\overline{)50}$ 25

Since 50 is larger than 25, you may go ahead and divide.

Example #2 $25\overline{)125}$ $25\overline{)12}$ 5

Since 12 is not larger than 25, you cannot divide yet. You must now compare 25 to the first three numbers.

$25\overline{)1250}$ $25\overline{)120}$ $25\overline{)1250}$ Now you can divide.

You know, there is an easy way, a **clue,** to dividing with large divisors. Compare just the first number of the divisor to the first number or two numbers of the dividend. This will give you a clue as to how many times the divisor **may go** into the dividend.

Example: $25\overline{)1250}$ $25\overline{)1250}$ $25\overline{)1250}$

In this example, we can find the clue to "how many" by dividing $2\overline{)12}$. By now, we all know the answer is 6. Now remember, this is only a clue. Take your answer (6) and multiply the divisor (25) by it. Take this answer and compare it to the first three numbers of the dividend.

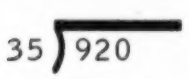
$$\begin{array}{r} 3 \\ 25 \\ \times\ 6 \\ \hline 150 \end{array}$$

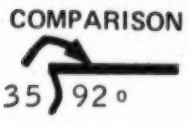
125
150

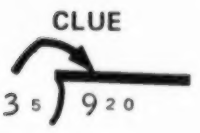
Since it is larger, it cannot be subtracted.

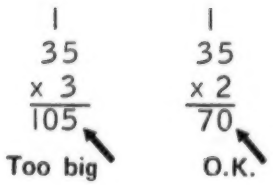
So then you multiply your divisor by the **next number down** from 6, which is 5. If this doesn't work, you do it again with the next number down until you can subtract.

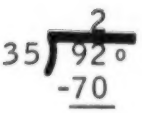
Example #1:

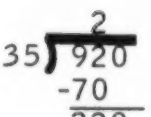


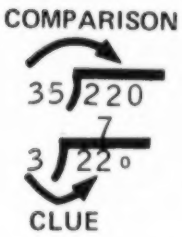


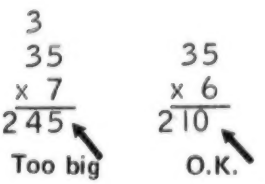


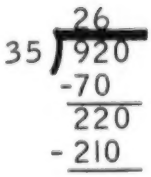


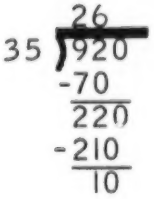


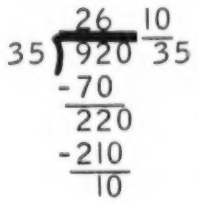




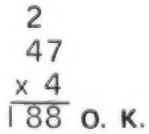


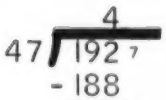


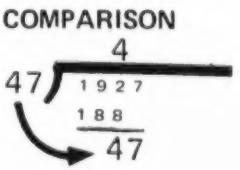


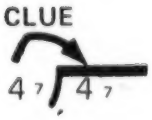


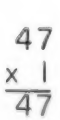
Example #2:

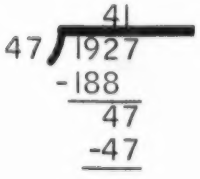












I think that this will be easier to understand if we do a few problems to gether.

$12\overline{)168}$ $42\overline{)972}$

$32\overline{)865}$

My Score _____

Best score is 15 correct answers.
Fair score is 10-12 correct answers.
(Prove <u>all</u> your work)

	A	B	C
1.	$14\overline{)168}$	$11\overline{)121}$	$12\overline{)144}$
2.	$11\overline{)341}$	$15\overline{)165}$	$12\overline{)264}$
3.	$13\overline{)169}$	$12\overline{)132}$	$13\overline{)299}$
4.	$22\overline{)484}$	$21\overline{)231}$	$14\overline{)154}$
5.	$12\overline{)156}$	$11\overline{)253}$	$24\overline{)504}$

My Score _____

Best score is 15 correct answers.
Fair score is 10-12 correct answers.
(Prove all your work)

	A	B	C
1.	$16\overline{)176}$	$12\overline{)168}$	$32\overline{)865}$
2.	$42\overline{)882}$	$21\overline{)945}$	$41\overline{)1,889}$
3.	$11\overline{)682}$	$62\overline{)2,976}$	$51\overline{)4,794}$
4.	$31\overline{)1,644}$	$91\overline{)5,152}$	$81\overline{)2,756}$
5.	$22\overline{)1,623}$	$41\overline{)1,914}$	$31\overline{)2,112}$

My Score _____

Best score is 15 correct answers.
Fair score is 10-12 correct answers.
(Prove your work)

	A	B	C
1.	$21\overline{)1,315}$	$83\overline{)4,814}$	$52\overline{)1,298}$
2.	$73\overline{)2,270}$	$82\overline{)6,891}$	$91\overline{)3,835}$
3.	$42\overline{)3,148}$	$51\overline{)1,340}$	$61\overline{)4,392}$
4.	$91\overline{)3,458}$	$73\overline{)2,076}$	$42\overline{)3,142}$
5.	$62\overline{)1,728}$	$81\overline{)5,629}$	$54\overline{)2,106}$

My Score _____

Best score is 15 correct answers.
Fair score is 10-12 correct answers.
(Prove your work)

	A	B	C
1.	$31\overline{)1,450}$	$52\overline{)3,250}$	$23\overline{)1,595}$
2.	$83\overline{)7,211}$	$41\overline{)3,682}$	$34\overline{)2,395}$
3.	$21\overline{)1,617}$	$64\overline{)3,776}$	$82\overline{)2,204}$
4.	$63\overline{)5,796}$	$92\overline{)3,528}$	$73\overline{)5,326}$
5.	$150\overline{)7,723}$	$121\overline{)3,468}$	$200\overline{)5,591}$

My Score _____

Best score is 10 correct answers.
Fair score is 6-8 correct answers.
(Be sure to prove your work)

---

1. $176\overline{)2,003}$

2. $425\overline{)40,375}$

3. $852\overline{)3,633}$

4. $279\overline{)4,000}$

5. $186\overline{)135,594}$

6. $900\overline{)39,540}$

7. $115\overline{)6,187}$

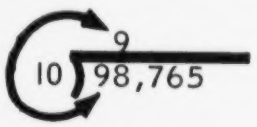
8. $617\overline{)2,799}$

9. $193\overline{)97,536}$

10. $264\overline{)765,072}$

Look Out!! Here he comes again! Old Number 10 – – –

Watch him divide for you without working your brain hard.

$10\overline{)98,765}$ 

Take the first number in the dividend and move it over the top of the number next to it. (One space!) Now just copy the rest of the dividend **except** the last number, which becomes your remainder.

$$10\overline{)\begin{array}{r}9\\98,765\end{array}} \qquad 10\overline{)\begin{array}{r}9\,876\\98,765\end{array}}\ 5/10$$

Try this one:

$10\overline{)8,436}$ $10\overline{)8,436}$

It works the same way with 100 or 1,000. The only difference is that you move the first number in the dividend as many spaces as there are zeros in the divisor.

Example:

$$100\overline{)\begin{array}{r}987\\98,765\end{array}}\ 65/100$$

$$1000\overline{)\begin{array}{r}98\\98,765\end{array}}\ 765/1000$$

Would you like to try a few? (Don't forget the remainder!)

$10\overline{)7679}$

$100\overline{)3549}$

$1000\overline{)9,830,492}$

My Score _____

Best score is 20 correct answers.
Fair score is 16-18 correct answers.
(Prove your work)

	A		B	
	Divide each of these by 10			
1.	400	_____	560	_____
2.	670	_____	389	_____
3.	97	_____	368	_____
4.	58	_____	846	_____
	Divide each of these by 100			
5.	900	_____	874	_____
6.	465	_____	750	_____
7.	283	_____	320	_____
8.	7,643	_____	4,650	_____
	Divide each by 1,000			
9.	5,600	_____	5,093	_____
10.	4,576	_____	44,587	_____

Sometimes you will find another sign for division which looks like this ÷. When a problem is written that looks like this:

$63 \div 9 =$

it means to divide 63 by 9

$(9\overline{)63})$.

Try these problems **without writing on paper.**

$42 \div 6 =$	$72 \div 9 =$
$36 \div 4 =$	$56 \div 7 =$
$54 \div 6 =$	$72 \div 8 =$
$48 \div 8 =$	$81 \div 9 =$
$49 \div 7 =$	$63 \div 7 =$
$64 \div 8 =$	$63 \div 9 =$

$11 \div 2 = 5$ and remainder _____ $\quad 15 \div 4 = 3$ and $\frac{\quad}{4}$

$13 \div 6 = 2$ and remainder _____ $\quad 23 \div 5 = 4$ and $\frac{\quad}{5}$

$31 \div 7 = 4$ and remainder _____ $\quad 67 \div 9 =$ ___ and $\frac{\quad}{9}$

$53 \div 8 = 6$ and remainder _____ $\quad 17 \div 3 =$ ___ and $\frac{\quad}{3}$

Let's not leave
before doing the problems
on the next page!

These questions would be of interest to boys.

1. The Driver Education car used 5 gallons of gas and traveled 75 miles. What was its average number of miles per gallon? _____

2. In four games David scored 4 points, 12 points, 13 points, and 7 points. What was his average per game? _____

3. The boys in Floriculture planted 1,794 flower bulbs for Easter. If the job took them six days, what was their average per day? _____

4. How many 5¢ candy bars can you buy for 35¢? _____

5. Alfred's father earns $10,400 a year. If he is paid 50 weeks a year, how much does he receive each week? $_____ If he is paid 52 weeks a year, how much would he receive each week? $_____

These will be of interest to boys.

1. Dr. Jochem drove his car 55,384 miles in 46 months. What was his average mileage per month? _____

2. Alex can set 450 words in 5 minutes on his Linotype machine. What is his average number of words per minute? _____

3. A Los Angeles pitcher struck out 120 men in twenty games. What was his average number of strke-outs per game? _____

4. The School News has 36 pages. If the boys have a total press run of 12,744 pages, how many School News magazines did they print?_____

5. The baseball team ordered 36 hot dogs on the way home from a game. If each player ate two hot dogs, how many players were on the team?_____

These problems will be of interest to boys.

1. Tommy worked part-time for 17 weeks. He earned $612 altogether. How much did he earn a week? _____

2. The lumber company sent a truckload of cinder blocks. If the truck can carry 4,000 lb. and each block weighs 8 lbs., how many blocks are on the truck? _____

3. In 3 hours of work, Walter printed 4,500 letterheads. What was his average per hour? _____

4. There are 58 railroad "ties" in each 528' of track. How many ties will be used in one mile? (1 mile = 5,280') _____

5. The 76'ers coach bought 59 basketballs to be used throughout the season. The balls cost $885. How much did each ball cost?

These problems will be of interest to boys.

1. Six boys went to Phil's house at the shore for a weekend of fishing. The boys caught 57 blowfish, 18 striped bass, 44 kingfish, and 25 sea robins. What was each boy's catch on the average? _____

2. The weekly payroll for a small newspaper was $4,510. If 55 people work for the paper, what was their average salary for the week? _____

3. Charles flew out to California to visit his aunt. This trip of 2,478 miles was finished in six hours. What was the plane's average speed? _____ M.P.H.

4. Mike washed dishes last summer in a restaurant. He washed 4,575 dishes in 15 days. What was the average number of dishes washed each day? _____

These problems will be of interest to girls.

1. A store bought 59 electric mixers for $885. What did each mixer cost? _____

2. Six pies can be made from a basket of 36 apples. How many apples go into each pie? _____

3. There are 16 pecks in 4 bushels. How many pecks are in one bushel? _____

4. Sally had 60¢ to buy 8¢ stamps. How many stamps can she buy? _____

5. Six of the girls in Home Economics, all working together, made 12 dozen cookies. What was the average number of cookies for each girl? _____

6. My house has 24 windows. If there are six rooms in my house, what is the average number of windows in each room? _____

These problems will be of interest to girls.

1. The Acme store received a truckload of sugar. The truck carried 4,000 lbs. If each bag of sugar weighs 5 lbs., how many bags of sugar were on the truck? _____

2. Clara worked part-time last year. In 17 weeks she earned $612. How much did she earn each week? $___ _____

3. A small pocketbook factory employs 55 people. If the weekly payroll for the factory is $4,510, how much is the average pay of the employees? $_____

4. Jane flew out to California to visit her aunt. The trip took six hours and covered 2,478 miles. What was her average speed? _____

These problems will be of interest to girls.

1. Jo Ann took a job washing dishes to earn money last summer. She washed 4,575 dishes in 15 days. What was the average number of dishes washed each day?_____

2. In four games Dianne scored 4 points, 12 points, 13 points, and 9 points. What was her average number of points per game? _____

3. The Driver Education car used 5 gallons of gas traveling 75 miles. What was the average number of miles per gallon?_____

4. Shirley's father earns $10,400 a year. How much does he receive each week if he is paid 50 weeks a year? $_____ . What would his weekly pay be if he was paid 52 weeks a year? $ _____

These problems will be of interest to girls.

1. The Business Training girls are printing a 36-page booklet on the mimeograph machine. If the girls run 12,744 pages altogether, how many booklets will this make?_____

2. The Flexowriter machine in the Business Training room types 450 words in 5 minutes. What is the average number of words typed in one minute? _____

3. The Field Hockey Team ordered 36 hot dogs to eat on their way home from a game. If each player ate two hot dogs, how many players were on the team?_____

4. The girls made 1,794 paper flowers for the Junior-Senior party a few days ago. If the job took six days, how many flowers did the girls average each day? _____

QUIZ

$4\overline{)84}$ $2\overline{)68}$ $3\overline{)36}$ $5\overline{)50}$

$7\overline{)77}$ $3\overline{)309}$ $4\overline{)840}$ $2\overline{)684}$

$5\overline{)500}$ $6\overline{)606}$ $4\overline{)168}$ $2\overline{)182}$

$42 \div 6 =$ _____ $72 \div 9 =$ _____

$54 \div 6 =$ _____ $36 \div 4 =$ _____

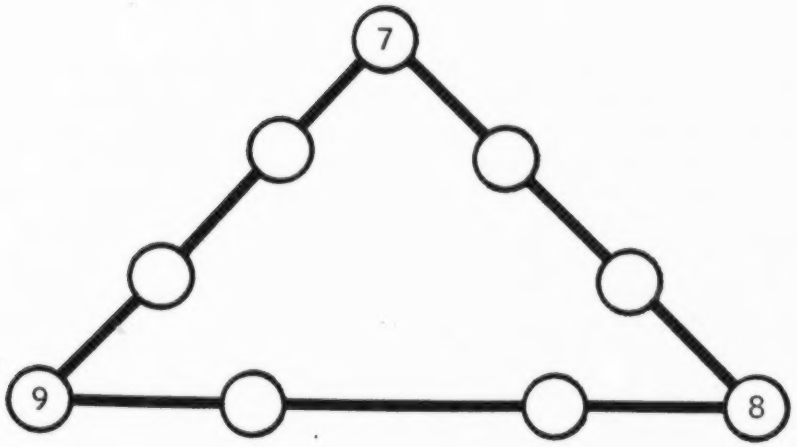
$56 \div 7 =$ _____ $49 \div 7 =$ _____

$64 \div 8 =$ _____ $63 \div 9 =$ _____

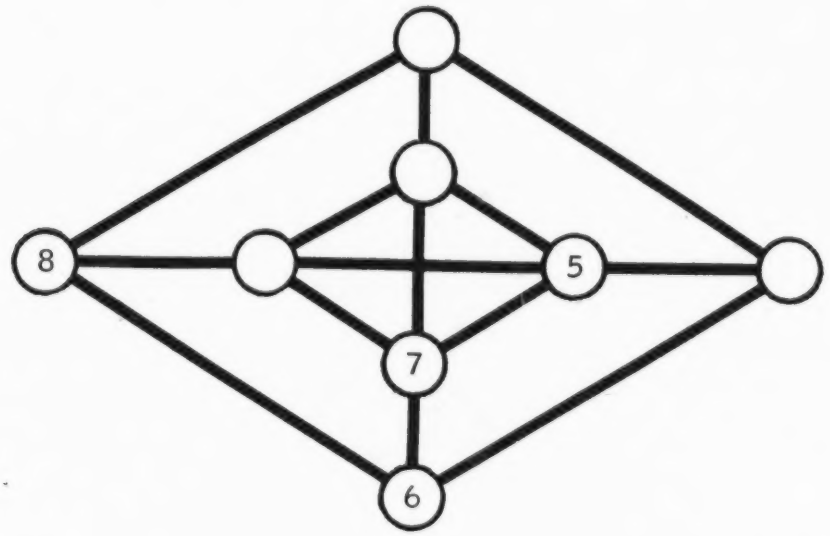
$7\overline{)4548}$ $8\overline{)6056}$ $10\overline{)1417}$

$12\overline{)384}$ $13\overline{)273}$ $23\overline{)989}$

$31\overline{)2359}$ $42\overline{)1473}$



Place numbers from 1-6 in the circles so that no matter which way you add around the triangle, the answer will be 23. Do not use the same number twice.



Place numbers from 1-4 in the circles so that no matter which way you add, around the circles, or up and down, or across, your answer will be 18. Do not use the same number twice.

Would you like to relax a little? Good, try this puzzle for fun.

The answer for each question has a dot in front of it. Find the dot that goes with each answer. Start with the dot that goes with your answer to # 1 and draw a **straight** line to the dot for the answer to # 2. Then draw a line from the dot for # 2 to the dot for # 3, and so on until you have completed a picture.

1. $2\overline{)104}$ =
2. 60 + 3 + 4 =
3. 6 x 12 =
4. $2\overline{)30}$ =
5. (2 x 5) - 2 =
6. one more than 12 =
7. 100 - 97 =
8. 3 x 4 =
9. (3 x 5) + 4 =
10. 56 - 7 =
11. 10 + 10 + 10 + 20 =
12. $10\overline{)430}$ =
13. 3 x 17 =
14. 23 + 35 =
15. $100\overline{)5900}$ =
16. (65 - 30) + 10 =

.1	.2	.3	.4	.5	.6	.7	.8
.9	.10	.11	.12	.13	.14	.15	.16
.17	.18	.19	.20	.21	.22	.23	.24
.25	.26	.27	.28	.29	.30	.31	.32
.33	.34	.35	.36	.37	.38	.39	.40
.41	.42	.43	.44	.45	.46	.47	.48
.49	.50	.51	.52	.53	.54	.55	.56
.57	.58	.59	.60	.61	.62	.63	.64
.65	.66	.67	.68	.69	.70	.71	.72

EXTRA CREDIT PROBLEMS

1. It takes 3 hours and 35 minutes to make a shop coat. If the order was for 16 coats, how long would it take to complete the order? _____

2a. Mary had a piece of drapery material that was 3 yards, 1 foot and 5 inches long. How many inches is that? _____

2b. Is Mary's cloth longer than Jessica's if Jessica's is 10' 2" long?_____

3. How many pieces of toweling 32" long can be cut from a bolt 192" long?
_____

4. A button-making factory makes 108,600 buttons a day. If the factory operates 8 hours a day, how many buttons are made each hour? _____

1. It took George Washington 12 days to travel by coach and horse from Philadelphia to Boston, a distance of about 312 miles. How many miles a day did he average?

   _____

2. The railroad distance from Philadelphia to Boston is now 296 miles. How many miles per hour does the train travel if it takes 6 hours to travel that distance? ____

3. Air travel from Philadelphia is even shorter and is 276 miles. How many miles per minute does a jet travel if it takes 60 minutes to fly the distance? _____

4. One of the first automobile races in the United States covered 80 miles. The winner took 5 hours to finish the race. What was his average speed? _____

5. An airliner flies daily from Trenton, N. J. to Omaha, Nebraska with the following stops and distances: Trenton to Pittsburgh 313.8 miles; to Cleveland 115.2 miles; to Chicago 307 miles; to Omaha 432.6 miles. How many miles does the airliner travel altogether? _____

1. Our baseball team played 25 games. They won 14, which is three less than the next best team. How many games did the other team win?_____ How many games did our team lose? _____

2. At the end of the fourth inning our baseball team led by 1 to 0. We scored 1 run in each of the next 5 innings, while the other team scored 2 in the seventh, 2 in the eighth, and 1 in the ninth. Which team won? _____
   What was the final score? Our team _____ Other team _____
   Who led after seven innings? _____

3. If a dozen baseballs cost $60.00, how much does one ball cost?_____ Mr. Dey has $20.00; how many baseballs can he buy at this price? _____

4. Mr. Dey put on new spikes on all the players' shoes. If a pair of shoes uses four sets of spikes and the spikes cost 25¢ each set, how much did it cost Mr. Dey to put new spikes on the 29 pairs of shoes? _____